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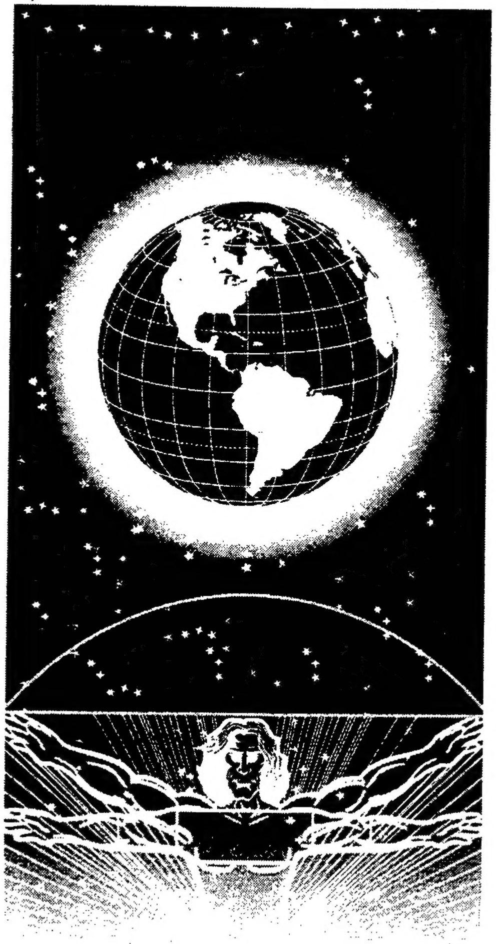

UNITED STATES AIR FORCE
IERA

Medical Waste Incinerator Emissions Test
Malcolm Grow Medical Center, Building 1056, Andrews Air Force Base, Maryland

Pacific Environmental Services, Inc.
560 Herndon Parkway, Suite 200
Herndon, VA 20170-5240

April 2001

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Air Force Institute for Environment, Safety and Occupational Health Risk Analysis
Risk Analysis Directorate
Environmental Analysis Division
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13. ABSTRACT *(Maximum 200 words)*

The Malcolm Grow Medical Center operates a medical waste incinerator at Andrews AFB under Maryland Department of the Environment Operating Permit No. 16-00655. This report presents the results of the initial performance testing as required by the operating permit.

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ACRONYM AND ABBREVIATION LIST

AFB	Air Force Base
AFIERA	Air Force Institute for Environmental Safety and Occupational Health Risk Analysis
Alta	Alta Analytical Perspectives
ASTM	American Society of Testing Materials
BSM	Base Surveillance Monitor
Cd	cadmium
CEMs	continuous emission monitors
CO	carbon monoxide
CO_2	carbon dioxide
COMAR	Code of Maryland Air Regulations
°F	degrees Fahrenheit
EPA	United States Environmental Protection Agency
FAL	First Analytical Laboratories
GC/MS	gas chromatography/mass spectrometry
GFC	Gas Filter Correlation
HCl	hydrogen chloride
Hg	mercury
ID	inner diameter
lb/hr	pounds per hour
MDE	Maryland Department of the Environment
MWI	medical waste incinerator
N2	nitrogen
NO	nitrogen oxide
NO_x	oxides of nitrogen
O_2	oxygen
OSHA	Occupational Safety and Health Administration
%	percent
Pb	lead
PCDD/PCDF	dioxins/dibenzofurans
PES	Pacific Environmental Services, Inc.
PM	particulate matter
ppmv	parts per million by volume
QA/QC	quality assurance/quality control
SO_2	sulfur dioxide
TPM	Technical Project Manager

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1.0 INTRODUCTION

The Malcolm Grow Medical Center operates a medical waste incinerator (MWI) at Andrews Air Force Base (AFB), Maryland. The MWI is permitted to burn Type O and infectious/pathological wastes and has a design (rated) capacity of 385 pounds per hour (lb/hr) for this type waste.

The MWI is operated under authority of Maryland Department of the Environment (MDE) Operating Permit No. 16-00655. The MWI is subject to the new MDE standards for medium size incinerators, **"Requirements for the Control of Emissions from Hospital Medical Infectious Waste Incinerators,"** Code of Maryland Air Regulations (COMAR) 26.11.08. These standards are derived from emission guidelines and compliance schedules published by the United States Environmental Protection Agency (EPA) on 15 September 1997 and implement sections 111(d) and 129 of the Clean Air Act and established emission limits for particulate matter (PM), carbon monoxide (CO), dioxins/dibenzofurans (PCDD/PCDF), hydrogen chloride (HCl), sulfur dioxide (SO_2), oxides of nitrogen (NO_x), lead (Pb), cadmium (Cd), and mercury (Hg). Initial performance testing was required for PM, CO, PCDD/PCDF, HCl, Pb, Cd, Hg, and opacity. In addition, the MDE required tests for SO_2 and NO_x.

Under contract to the United States Air Force Institute for Environmental Safety and Occupational Health Risk Analysis (AFIERA), Pacific Environmental Services, Inc. (PES) conducted the required testing during the period 31 January through 2 February 2001. The AFIERA point of contact and Technical Project Manager (TPM) for this delivery order was:

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2.0 RESULTS SUMMARY

The emissions results summary is shown in Table 2.1.

TABLE 2.1

EMISSIONS RESULTS SUMMARY

Run No./Date	1	2	3	Average	Standard[a]
Particulate Matter	2/2	2/2	2/2		
mg/dscm@7% O_2	8	104	93	68	69
Carbon Monoxide	2/1	2/1	2/2		
ppmvd@7% O_2	< 2	< 2	< 2	< 2	40
Dioxins/Furans	1/31	1/31	2/1		
ng/dscm total CDD/CDF@7% O_2	1	1	< 1	< 1	125
Hydrogen Chloride	1/31	2/1	2/2		
ppmvd@7% O_2	23	3	9	12	100
Sulfur Dioxide	2/1	2/1	2/2		
ppmvd@7% O_2	< 2	3	< 2	< 2	55
Nitrogen Oxides	2/1	2/1	2/2		
ppmvd@7% O_2	102	100	96	99	250
Lead	2/2	2/2	2/2		
mg/dscm@7% O_2	0.6	0.8	0.6	0.7	1.2
Cadmium	2/2	2/2	2/2		
mg/dscm@7% O_2	0	0.01	0.01	0.01	.16
Mercury	2/2	2/2	2/2		
mg/dscm@7% O_2	0.09	0.01	0.00	0.03	0.55
Visual Opacity, %	2/2	2/2	2/2		
	0-5	0-5	0-5	0-5	10

[a] MDE COMAR 26.11.08

3.0 SOURCE DESCRIPTION

The MWI is a Joy Energy Systems Model 480-E incinerator consisting of both a primary (lower) and a secondary (upper) combustion chamber. The primary chamber is equipped with an on/off natural gas burner and a manually adjusted underfire air blower. The secondary chamber is equipped with a modulating high/low natural gas burner. Additional combustion air is supplied by a modulating blower, located between the primary and secondary chambers. The primary and secondary combustion chambers operate at temperatures of approximately 1665°F and 1695°F, respectively.

The incinerator is utilized to burn Type O and infectious/pathological waste generated at the hospital. The rated capacity is 385 lb/hr. Loading of waste is accomplished with the use of a hopper/hydraulic ram mechanical waste feed system. Continuous monitoring instrumentation for the incinerator includes thermocouples and a circular chart recorder for recording primary and secondary combustion chamber temperature.

Particulate air emissions are controlled with an Airpol high energy venturi scrubber. Caustic sodium hydroxide is added to the scrubber to enhance removal of acid gases. The scrubber liquid is recirculated through the venturi system with a specified amount bled off and replaced with fresh make-up liquid. A stainless steel impact mist eliminator, located downstream of the venturi, helps control the amount of entrained water droplets carried over to the fan and stack. Continuous monitoring instrumentation for the scrubber includes a draft gage for measuring the pressure drop across the venturi, a thermocouple for measuring the venturi inlet gas temperature, a flow meter for measuring the scrubber liquid flow rate, and a meter for measuring the pH of the scrubber liquid.

4.0 SAMPLING LOCATION

The MWI is located in a single-story building. The stack extends vertically through the roof and to a height of about 10 feet above the roof. The sampling site for the manual sampling was located inside the MWI building in a 15-3/8 inch inner diameter (ID) round vertical stack, 170 inches (11.1 stack diameters) downstream of the nearest flow disturbance (fan outlet) and 175 inches (11.4 stack diameters) upstream of the nearest flow disturbance (atmosphere). According to EPA Method 1 criteria, this location requires 12 sample traverse points, 6 along each of 2 perpendicular diameters. Sampling was accomplished through two existing 3-inch ID test ports. The sample traverse point locations are shown in Figure 4.1. A separate test port for the portable continuous emission monitor (CEMs), which were used for the instrumental methods, was installed about 48 inches upstream of the manual methods sampling site. Access to the manual sampling location was provided by scaffold and staging, approved by the Occupational Safety and Health Administration (OSHA), erected by PES.

Although cyclonic flow conditions were not expected at the sampling locations, PES performed a check to verify the absence of cyclonic or nonparallel flow in accordance with the procedure specified in Section 2.4 of EPA Method 1. The results indicated an average angle of rotation of 0 degrees to obtain a null velocity reading.

Circular Stack Method 1 Calculation Results

Date: 03/23/01 Time: 10:23:10

Facility:	Malcolm Grow Med. Center MWI
Source ID:	C2 (MWI)
Source Name:	Joy Energy Systems MWI
Date:	01/31/01
Calculated By:	F. Meadows

Input Values

Traverse Point Type:	Sample - M5	
Inside of far wall to outside of nipple:	17 3/8	(inches)
Nipple Length:	2 even	(inches)
Distance from Upstream Disturbance:	170 even	(inches)
Distance from Downstream Disturbance:	175 even	(inches)
Number of ports:	2 ports at 90 degrees	

Calculated Values

Inside Diameter:	15.3750	(inches)
Upstream Duct Diameters:	**11.05**	
Downstream Duct Diameters:	**11.38**	
Mininum Traverse Points:	**12**	

Traverse Point Number	Fraction of Length	Length (inches)	Product of Columns 2 & 3	Nipple Length (inches)	Traverse Point Location Sum of Col. 4 & 5
1	0.044	15 3/8	0 11/16	2 even	2 11/16
2	0.146	15 3/8	2 1/4	2 even	4 1/4
3	0.296	15 3/8	4 9/16	2 even	6 9/16
4	0.704	15 3/8	10 13/16	2 even	12 13/16
5	0.854	15 3/8	13 1/8	2 even	15 1/8
6	0.956	15 3/8	14 11/16	2 even	16 11/16

Figure 4.1 MWI Sample Traverse Point Locations

5.0 SAMPLING AND ANALYTICAL PROCEDURES

Table 5.1 summarizes the test parameters, test methods, number of tests, and duration of each sampling event. Brief descriptions of the methods conducted are provided below.

5.1 LOCATION OF MEASUREMENT SITES AND SAMPLE /VELOCITY TRAVERSE POINTS

EPA Method 1, "Sample and Velocity Traverses for Stationary Sources," was used to select the measurement site and to establish velocity and sample traverse point locations. The measurement site is discussed in Section 4.0.

5.2 DETERMINATION OF STACK GAS VOLUMETRIC FLOW RATE

EPA Method 2, "Determination of Stack Gas Velocity and Volumetric Flow Rate (Type S Pitot Tube)," was used to determine stack gas volumetric flow rate. A Type S pitot tube, constructed according to Method 2 criteria and having an assigned coefficient of 0.84, connected to an inclined-vertical manometer, was used to measure velocity pressure. A calibrated Type K thermocouple attached directly to the pitot tube was used to measure stack gas temperature. The average stack gas velocity was calculated from the average square roots of the velocity pressure, average stack gas temperature, stack gas molecular weight, and absolute stack pressure. The volumetric flow rate is the product of stack gas velocity and the stack cross-sectional area.

TABLE 5.1

TEST PARAMETERS AND TEST METHODS SUMMARY

Parameter	EPA Test Methods	No. of Tests	Time per Test (minutes)
Volumetric Flow Rate	1 & 2	3	240
Molecular Weight, Emission Correction Factors	3A	-[a]	-[a]
Moisture	4	6[b]	3 @ 60 each 3 @ 240 each
Sulfur Dioxide	6C	3	60
Nitrogen Oxides	7E	3	60
Carbon Monoxide	10	3	60
Dioxin/Furan (PCDD/PCDF)	23	3	240
Particulate Matter/Metals	5/29	3	60
Hydrogen Chloride	26	3	60

[a] Continuous with all manual and CEM pollutant measurement runs.

[b] Moisture content was determined using both the M23 and M5/29 sample trains.

5.3 DETERMINATION OF DRY MOLECULAR WEIGHT AND EMISSION CORRECTION FACTORS

EPA Method 3A, "Determination of Oxygen and Carbon Dioxide Concentration in Emissions From Stationary Sources (Instrumental Analyzer Procedure)," was used to determine oxygen (O_2) and carbon dioxide (CO_2) content of the stack gas. This procedure was part of the extractive continuous emission monitoring apparatus described in Section 5.8.

5.4 DETERMINATION OF STACK GAS MOISTURE CONTENT

EPA Method 4, "Determination of Moisture Content in Stack Gases," was used to determine stack gas moisture content. Moisture was determined using both the EPA Method 23 and EPA Method 29 sample trains. The quantity of condensed water was determined gravimetrically and then compared to the dry volume of gas sampled to determine the volume % moisture content. The moisture values obtained from the Method 23 and Method 29 sample trains were also used to adjust the SO_2, NO_x, and CO concentrations to 7% O_2.

5.5 DETERMINATION OF POLYCHLORINATED DIBENZO-P-DIOXINS AND POLYCHLORINATED DIBENZOFURANS

EPA Method 23, "Determination of Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans From Stationary Sources," was used to determine total PCDD/PCDF. Samples were withdrawn from the gas stream isokinetically and collected via the sample probe onto a glass fiber filter, followed by a packed column of XAD-2 adsorbent material. The PCDD/PCDF were extracted from the samples and analyzed using high resolution gas chromatography/mass spectrometry (GC/MS). PES selected Alta Analytical Perspectives (Alta),

Wilmington, North Carolina, to prepare the filters and adsorbent traps and to perform the required analyses.

A schematic of the Method 23 sampling apparatus is shown in Figure 5.1. Each measurement run was 4 hours in duration, as required by 40 CFR, Part 60, Subpart Ec, Paragraph 60.56c(b)(9).

5.6 DETERMINATION OF HYDROGEN CHLORIDE

EPA Method 26, "Determination of Hydrogen Chloride Emissions From Stationary Sources," was used to determine HCl emissions. An integrated sample was withdrawn from the stack and passed through a prepurged heated probe and filter into a series of midget impingers containing dilute sulfuric acid and dilute sodium hydroxide solutions, which collected gaseous hydrogen halides and halogens. A schematic of the Method 26 sampling train is shown in Figure 5.2. Each measurement run was 1 hour in duration. PES selected First Analytical Laboratories (FAL), Chapel Hill, North Carolina, to perform the required analyses.

5.7 DETERMINATION OF PARTICULATE MATTER AND METALS

EPA Method 29, "Determination of Metals Emissions From Stationary Sources," was used to determine filterable particulate matter and metals. The target metals included Cd, Pb, and Hg. Samples were withdrawn from the gas stream isokinetically and collected via the sample probe onto a tared quartz-fiber filter, followed by a series of impingers containing aqueous acidic solutions of hydrogen perioxide (analyzed for Cd and Pb) and an aqueous acidic solution of potassium permanganete (analyzed for Hg). The probe filter fractions were analyzed

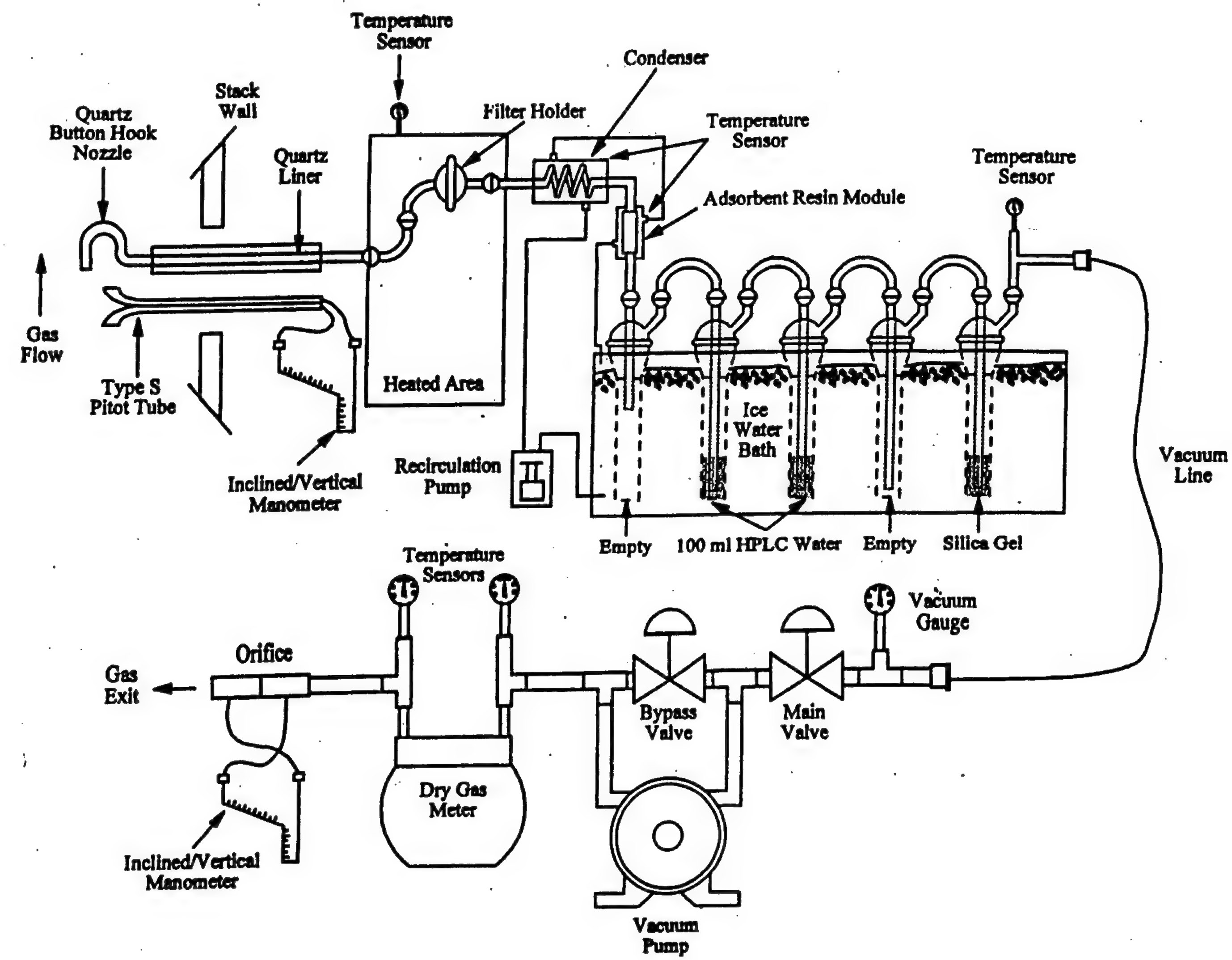


Figure 5.1 EPA Method 23 Sampling Apparatus

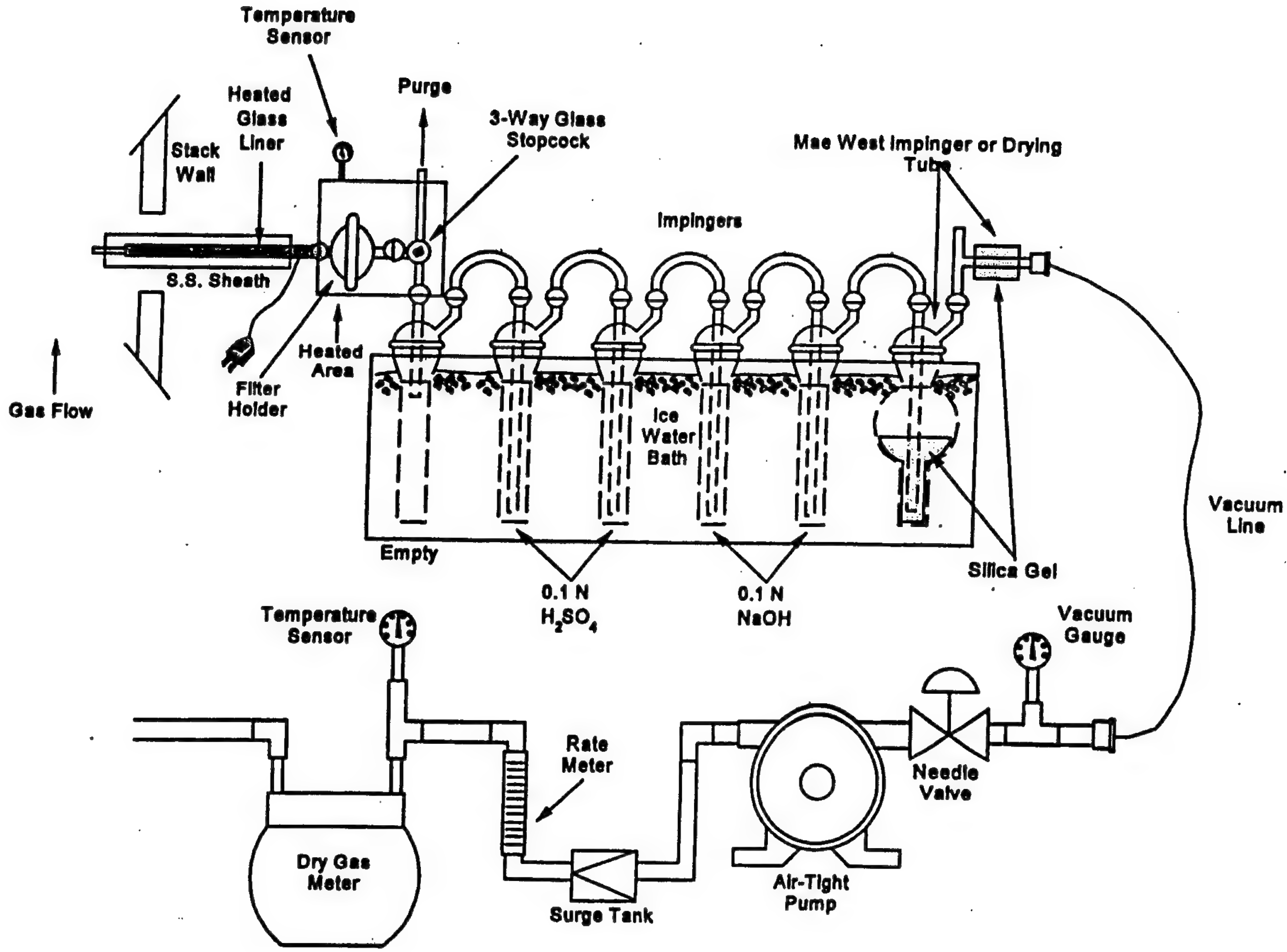


Figure 5.2 EPA Method 26 Hydrogen Chloride Sampling Apparatus

gravimetrically in the PES laboratory in Research Triangle Park, North Carolina, to determine filterable particulate matter. Upon completion of the particulate matter analyses, the particulate fractions and aqueous fractions were submitted to FAL for the metals analyses.

A schematic of the Method 29 sampling train is shown in Figure 5.3. Each measurement run was 1 hour in duration.

5.8 SULFUR DIOXIDE, OXIDES OF NITROGEN, AND CARBON MONOXIDE

SO_2, NO_x, and CO concentrations were measured using instrumental analyzers in accordance with EPA Methods 6C, 7E, and 10. An extractive sampling system was setup as shown in Figure 5.4. Although EPA Methods 6C, 7E, and 10 require a heated sample probe, Bill Reamy of the MDE approved the use of an unheated sample probe. This deviation from the method eliminated the need to install costly additional test ports in the stack. The sampling system consisted of a short sample probe about 8 inches in length, a heated out-of-stack filter, a calibration valve assembly, a short heated Teflon® sample line, a sample gas conditioner (chiller), an unheated Teflon® sample transport line, and a sample gas manifold to direct the sample gas to the analyzers.

The SO_2 analyzer was a Western Research Model 721 ATM unit that uses the analytical technique of ultraviolet fluorescence. The instrument had user-defined ranges of 50 to 5000 parts per million by volume (ppmv). The instrument was calibrated using SO_2-in-nitrogen (N_2) calibration gases prepared in accordance with EPA Protocol. Two upscale calibration gases corresponding to 40-60 and 80-100% of span and zero gas (ambient air) were used. The instrument was operated on a 0-100 ppmv range.

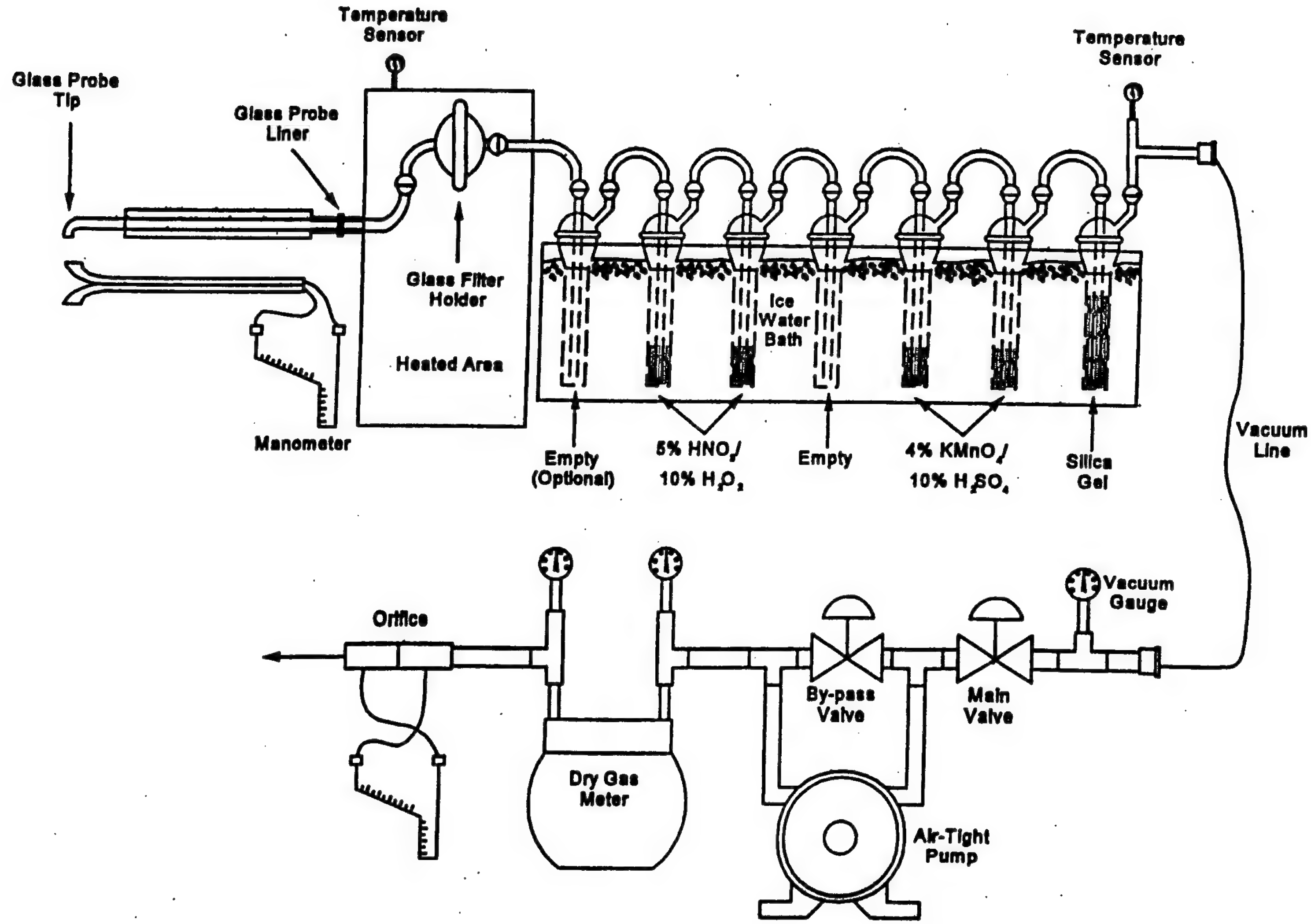


Figure 5.3 EPA Method 5/29 Particulate Matter/Metals Sampling Apparatus

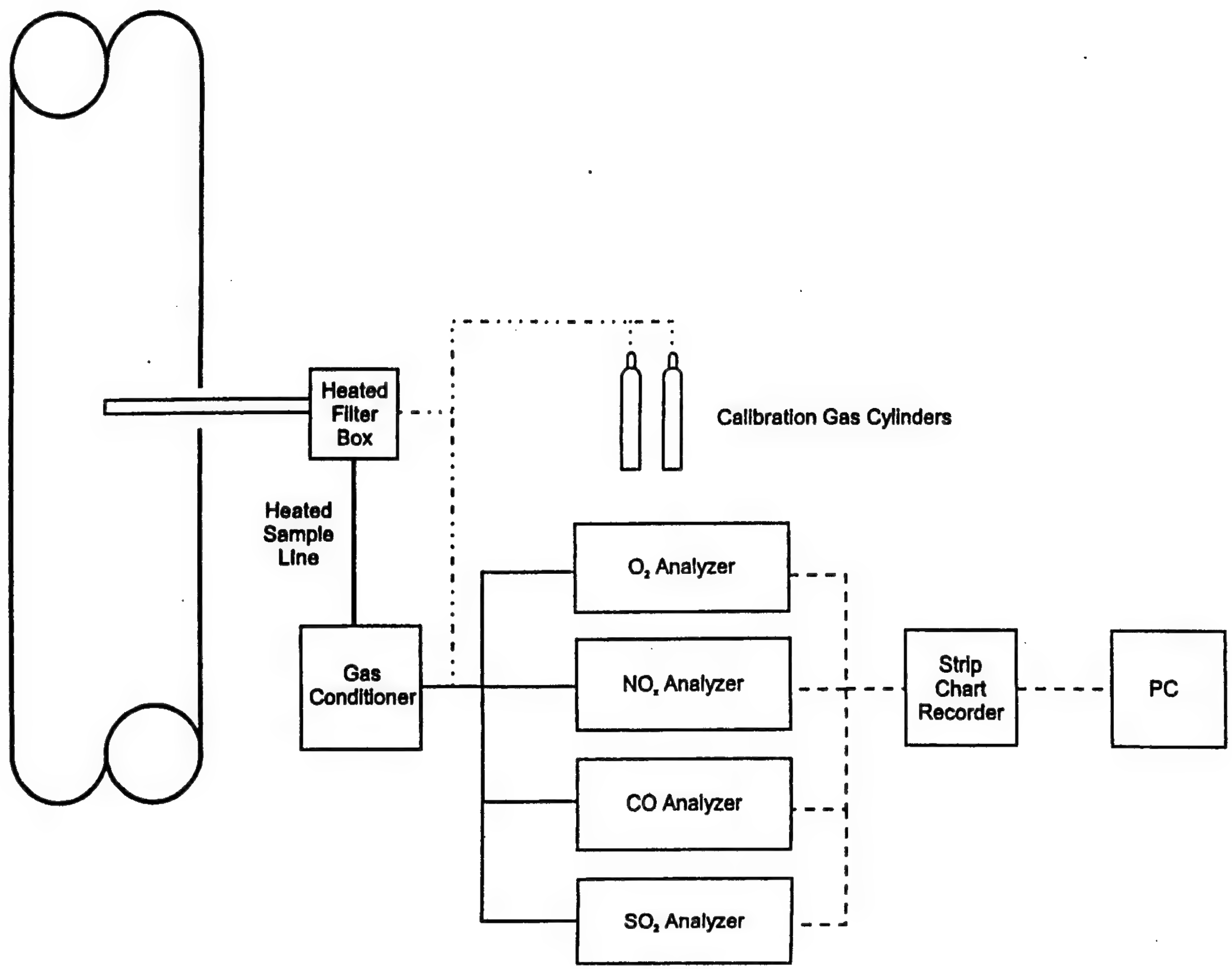


Figure 5.4 EPA Methods 3A, 6C, 7E, and 10 Instrumental Methods Extractive Sampling/Monitoring System

The NO_x analyzer was an API unit that uses the principle of chemiluminescence to determine the NO_x concentration continuously. The instrument was operated on the range of 0-500 ppmv as nitrogen oxide (NO). The instrument was calibrated using NO-in-N_2 calibration gases prepared in accordance with EPA Protocol. Two upscale calibration gases corresponding to 40-60 and 80-100% of span, and zero gas (ambient air) were used. Prior to testing, the NO_2 to NO conversion efficiency was checked in accordance with the procedures in
Section 5.6.1 of EPA Method 20.

The CO analyzer was a Thermo Environmental Instruments Model 48C Gas Filter Correlation (GFC) unit that uses the principle of infrared absorption. The GFC system responds specifically to CO, so it was not necessary to make a CO_2 correction as specified in Section 9 of Method 10. The instrument was operated on the range of 0-100 ppmv. The instrument was calibrated using three upscale CO-in-N_2 calibration gases corresponding to approximately 30, 60, and 90% of span. Prepurified N_2 was used for the zero gas. The gases were certified by the manufacturer to be within $\pm 2\%$ of the specified concentration.

Pretest preparations included calibration error checks, sampling system bias checks, and response time checks for the respective analyzers. Post-test checks included zero and calibration drift tests. The output signal from each instrument was continuously recorded using a strip chart recorder and data logger.

5.9 DETERMINATION OF VISUAL OPACITY

EPA Method 9, "Visual Determination of the Opacity of Emissions From Stationary Sources," was used to determine visual opacity. PES provided a certified observer to observe and record opacity of the plume where condensed water was not present.

6.0 QUALITY ASSURANCE/QUALITY CONTROL PROCEDURES

This section describes the specific quality assurance/quality control (QA/QC) procedures employed by PES in performing this series of tests. The goals of the QA/QC activities for this project were intended to ensure, to the highest degree possible, the accuracy of the data collected. The procedures contained in the "Quality Assurance Handbook for Air Pollution Measurement Systems, Volume III, Stationary Source Specific Methods," EPA-600/R-94/038C, served as the basis for the performance of all testing and related work activities on this project. All calibration requirements were met by the sampling equipment used to conduct this test program.

6.1 CALIBRATION OF APPARATUS

The preparation and calibration of source sampling equipment is essential in maintaining data quality. Brief descriptions of the calibration procedures used by PES are presented below.

6.1.1 Barometers

PES uses aneroid barometers that are calibrated against a station pressure value reported by a nearby National Weather Service Station, corrected for elevation.

6.1.2 Temperature Sensors

Bimetallic dial thermometers and Type K thermocouples are calibrated using the procedure described in Section 3.4.2 of EPA's Quality Assurance Handbook.

Each temperature sensor was calibrated over the expected range of use against an American Society for Testing Materials (ASTM) 3C or 3F thermometer. Table 6.1 summarizes the types of calibrations performed and the acceptable levels of variance. Potentiometers were calibrated using a thermocouple simulator having a range of 0-2400°F.

6.1.3 Pitot Tubes

PES used Type S pitot tubes that were constructed to EPA Method 2 specifications. Pitot tubes meeting these criteria are assigned a baseline coefficient of 0.84 and need not be calibrated.

6.1.4 Differential Pressure Gages

PES used Dwyer inclined and inclined/vertical manometers to measure differential pressures. These parameters included velocity pressure, static pressure, and meter orifice pressure. Manometers were selected with sufficient sensitivity to accurately measure pressures over the entire range of expected values. Manometers are primary standards and require no calibration.

6.1.5 Dry Gas Meters and Orifices

Dry gas meters and orifices were calibrated in accordance with Section 3.3.2 of EPA's Quality Assurance Handbook. This procedure involved direct comparison of the dry gas meter to a reference dry test meter. The reference dry test meter was calibrated using a wet test meter or a liquid displacement technique. Before its initial use in the field, the metering system was calibrated over the entire range of operation. After each field use, the metering system was calibrated at a single intermediate setting based on the previous field test.

TABLE 6.1

SUMMARY OF TEMPERATURE CALIBRATIONS

Temperature Sensor	Number of Calibration Points	CALIBRATION MEDIA					Tolerances
		Ice Bath (0°C)	Ambient Air (20-25°C)	Hot Water (40-50°C)	Boiling Water (100°C)	Heated Oil (150-200°C)	
Impinger Outlet Thermocouple	2	*	*				±1°C
Dry Gas Meter Thermometer	2		*	*			±3°C
Stack Temperature Sensor	3	*			*	*	±1.5°C of reference temperature

*: designates calibration point.

Acceptable tolerances for the initial and final dry gas meter factors and orifice calibration factors are ± 0.02 and ± 0.20 from average, respectively.

6.2 ON-SITE QA/QC

The on-site QA/QC activities are discussed below.

6.2.1 Measurement Sites

Prior to sampling, all stack dimensions were checked to verify measurement site locations, location of test ports, and inside stack dimensions. Inside dimensions were checked through all available test ports to verify uniformity of the stack cross-sectional area, and the sample test ports were checked to verify that they did not extend beyond the inside wall. The inside stack dimensions, wall thickness, and sample port depths were measured to the nearest 1/16 inch.

6.2.2 Velocity Measurements

All velocity measurement apparatus was assembled, leveled, zeroed, and leak-checked prior to use and at the end of each determination. The static pressure was determined at a single point near the center of the stack cross section.

6.2.3 Integrated Flue Gas Sampling

Integrated multipoint flue gas samples were collected in Tedlar® gas bags by traversing the stack cross-sectional area simultaneously with each PM/metals and PCDD/PCDF measurement run. The sample train was assembled and

leak-checked before and after each test run. Prior to each test run, the gas bags were leak-checked and purged with nitrogen to ensure that no contamination of the sample occurred.

During sampling, Fyrite® combustion gas analyzers were used to determine % concentrations of CO_2 and O_2. These instruments were used as a confirmatory technique for the Orsat analysis.

6.2.4 Moisture

Stack gas moisture content was determined simultaneously using both the PM/metals and the PCDD/PCDF sample trains. During sampling, the exit gas of the last impinger was maintained below 68°F to ensure complete condensation of the stack gas water vapor. The total moisture was determined gravimetrically and included the condensate collected in the Method 23 adsorbent trap.

6.2.5 Sulfur Dioxide, Oxides of Nitrogen, and Carbon Monoxide Instrumental Methods

The on-site QC requirements for EPA Methods 6C, 7E, and 10 included the following:

> Analyzer Calibration Error – Less than ±2% of the span for the zero, mid-range, and high-range calibration gases.
>
> Sampling System Bias – Less than ±5% of the span for the zero and mid- or high-range calibration gases.

Calibration Drift - Less than ±3% of the span over the period of each run.

EPA Methods 6C and 7E required the use of calibration gases prepared according to EPA Protocol and certified to be within ±1% of the specified concentrations. EPA Method 10 required the use of calibration gases that were certified to be within ±2% of the specified concentrations. Additional QC checks included up- and down-scale response time checks.

6.2.6 Dioxin/Furan (PCDD/PCDF)

The field sampling QA/QC procedures were similar to those for PM/metals. The adsorbent cartridges were spiked with surrogate standards in the laboratory prior to collecting the field samples.

6.2.7 Particulate Matter/Metals and Hydrogen Chloride

The field sampling QA/QC procedures included the cleaning and preparation of all sampling train glassware and sample containers, use of prescribed reagents and filters, pre- and post-test leak checks of the sampling apparatus, sample recovery as prescribed in the proposed method, and retention of unused filters and reagents for use as blanks.

6.2.8 Sample Handling and Chain-of-Custody

All samples not analyzed on site (PCDD/PCDF, HCl, PM/metals) were logged into a master logbook and given an alpha-numeric identification code. The samples were clearly labeled and sealed. Samples were stored in an area of limited access. Upon completion of the particulate analyses in the PES laboratory in Research

Triangle Park, North Carolina, the PCDD/PCDF, HCl, and metals samples were hand-delivered to PES' contract laboratories for analyses. A chain-of-custody report form accompanied all samples delivered to each laboratory and documented all handling through final disposition.

6.3 ANALYSIS

6.3.1 Particulate Matter/Metals

Analysis for particulate matter was performed in the PES laboratory. Field blanks of acetone were taken directly from the wash bottle used in recovering the samples. Three (3) blank filters were also exposed and handled at the sample recovery site. The acetone blank and filter blanks were submitted to the laboratory and analyzed with the samples.

Upon receipt of the samples at the PES laboratory, the samples and blanks were analyzed in strict accordance with Section 4.3 of EPA Method 5. Prior to any weighings, PES' analytical balance was checked for calibration with known weights.

The sample and blank filters were placed in a tared glass weighing dish and desiccated for 24 hours in a desiccator containing anhydrous calcium sulfate. The filters were weighed to a constant weight and the results reported to the nearest 0.1 mg. The term "constant weight" means a difference of no more than 0.5 mg or 1% of total weight less tare weight, whichever is greater, between two consecutive weighings, with no less than 6 hours of desiccation time between weighings. The sample and blank acetone solutions were checked to confirm the level of liquid in the containers in order to determine whether or not leakage occurred during transport. If a noticeable amount of leakage had occurred, the

sample was voided, or other methods were used such as adjusting the final analysis for the amount of spillage. The liquid in each sample container was measured gravimetrically to ± 0.5 g. The contents were transferred to a tared 250-ml beaker and evaporated to dryness at ambient temperature and pressure. The beakers were then desiccated for 24 hours and weighed to a constant weight. The results were reported to the nearest 0.1 mg. Filterable particulate matter was the sum of the particulate matter in the acetone rinse (blank corrected) and that caught on the filter.

Upon completion of the particulate analyses, these samples, along with the metals train aqueous samples, were hand-delivered to FAL for determination of the target metals following the analytical and quality control procedures prescribed in Method 29. The samples were delivered to FAL within 6 working days after the completion of the field tests. The analyses were performed within 21 working days after receipt of the samples by FAL.

6.3.2 Dioxin/Furan (PCDD/PCDF)

The PCDD/PCDF samples were submitted to Alta for analysis following the procedures prescribed in Section 5 of Method 23 and proposed revisions. GC/MS system checks included initial calibration and daily performance checks. Specific QC checks included the determination of internal standard recovery efficiencies and the determination of surrogate recoveries. Recoveries of internal standards must be between 40 to 130% for the tetra-through hexachlorinated compounds, while the range is 25 to 130% for the higher hepta- and octachlorinated homologues. Surrogate recovery efficiencies were required to be between 70 and 130%.

PPENDIX A

OCESS DATA

INCINERATOR OPERATION

ERATOR	DATE	TIME	WEIGHT	PRIMARY	SECODNARY	BOXES
[illegible]	1-31-01	112	54	1881	1796	2
[illegible]	1-31-01	125	49	1874	1798	2
[illegible]	1-31-01	135	52	1860	1797	2
[illegible]	1-31-01	146	48	1860	1796	2
[illegible]	1-31-01	159	52	1855	1792	2
[illegible]	1-31-01	214	48	1666	1778	2
[illegible]	1-31-01	227	55	1612	1782	2
[illegible]	1-31-01	240	60	1645	1782	2
[illegible]	1-31-01	250	48	1968	1901	2
[illegible] not testing	1-31-01	336	40	1193	1729	2
[illegible] not testing	1-31-01	348	38	1456	1761	2
[illegible] not testing	1-31-01	404	36	1342	1744	2
[illegible]	1-31-01	415	54	1479	1771	2
[illegible]	1-31-01	425	58	1605	1774	2
[illegible]	1-31-01	439	52	1633	1776	2
[illegible]	1-31-01	452	60	1710.	1780	2
[illegible]	1-31-01	502	54	1948	1813	2

850

34

INCINERATOR OPERATION

ERATOR	DATE	TIME	WEIGHT	PRIMARY	SECODNARY	BOXES
[illegible]	1-31-01	513	51	2000	1759	2
[illegible]	1-31-01	523	54	1960	1802	2
[illegible]	1-31-01	540	50	1604	1764	2
[illegible]	1-31-01	550	57	1785	1800	2
[illegible]	1-31-01	603	52	1796	1282	2
[illegible]	1-31-01	614	54	1886	1797	2
[illegible]	1-31-01	624	51	1898	1797	2
[illegible]	1-31-01	638	53	1707	1779	2
[illegible]	1-31-01	649	60	1957	1804	2
[illegible]	1-31-01	700	51	2052	1837	2
[illegible]	1-31-01	712	49	1898	1800	2
[illegible]	1-31-01	723	60	1962	1802	2
[illegible]	1-31-01	733	57	1821	1789	2
[illegible]	1-31-01	746	46	1580	1780	2
[illegible]	1-31-01	756	52	1874	1801	2
[illegible]	1-31-01	806	49	1965	1829	2
	1-31-01	816	51	1870	1806	2
			897			34

INCINERATOR OPERATION

ERATOR	DATE	TIME	WEIGHT	PRIMARY	SECODNARY	BOXES
[illegible]	1-31-01	826	33	1886	1804	2
[illegible] wt 14,820	1-31-01	839	50	1890	1802	2
[illegible]	2-1-01	905	55	1462	1951	2
[illegible]	2-1-01	916	51	1478	1750	2
[illegible]	2-1-01	929	49	1402	1759	2
[illegible]	2-1-01	939	47	1480	1746	2
[illegible]	2-1-01	949	50	1552	1760	2
[illegible]	2-1-01	959	48	1876	1780	2
[illegible]	2-1-01	1010	46	1818	1788	2
[illegible]	2-1-01	1021	49	1869	1789	2
[illegible]	2-1-01	1032	47	1720	1720	2
[illegible]	2-1-01	1042	49	1830	1785	2
[illegible]	2-1-01	1052	47	1820	1780	2
[illegible]	2-1-01	1102	45	1760	1784	2
[illegible]	2-1-01	1114	43	1772	1781	2
[illegible]	2-1-01	1125	60	1679	1779	2
[illegible]	2-1-01	1141	40	1910	1790	2
			[illegible]			30

boxes / 713

INCINERATOR OPERATION						
OPERATOR	DATE	TIME	WEIGHT	PRIMARY	SECONDARY	BOXES
	2-1-01	1152	46	1851	1785	2
	2-1-01	1204	48	1682	1767	2
	2-1-01	1216	45	1800	1794	2
	2-1-01	1226	47	1701	1725	2
	2-1-01	1237	52	1691	1763	2
	2-1-01	1252	48	1561	1765	2
	2-1-01	103	49	1970	1670	2
not a test	2-1-01	138	38	1401	1738	1
not a test	2-1-01	151	36	1432	1761	2
	2-1-01	221	50	1188	1700	2
	2-1-01	231	52	1502	1757	2
	2-1-01	242	49	1496	1766	2
	2-1-01	253	53	1641	1750	2
	2-1-01	305	57	1596	1763	2
not testing	2-1-01	319	37	1597	1769	2
not testing	2-1-01	334	39	1410	1750	2
not testing	2-1-01	344	37	1478	1745	3

783

A-5

34

10:50 Am

Bob came on 2-2-01 scubble chart not printing

INCINERATOR OPERATION

ERATOR	DATE	TIME	WEIGHT	PRIMARY	SECODNARY	BOXES
[illegible] not testing	2-1-01	406	37	1376	1755	2
[illegible]	2-2-01	848	53	1443	1934	2
[illegible]	2-2-01	859	56	1493	1765	2
[illegible]	2-2-01	911	49	1412	1743	2
[illegible] not tessting	2-2-01	929	38	1310	1746	2
[illegible]	2-2-01	944	48	1411	1713	2
[illegible]	2-2-01	954	51	1462	1753	2
[illegible]	2-2-01	1004	53	1686	1767	2
[illegible]	2-2-01	1015	49	1850	1781	2
[illegible]	2-2-01	1025	47	1851	1772	2
[illegible]	2-2-01	1035	50	1856	1782	2
[illegible]	2-2-01	1048	60	1760	1788	2
[illegible]	2-2-01	1100	58	1795	1777	2
[illegible]	2-2-01	1229	49	1357	1730	2
[illegible]	2-2-01	140	48	1646	1751	2
[illegible]	2-2-01	150	50	1697	1782	2
[illegible]	2-2-01	200	50	1703	1786	2

846

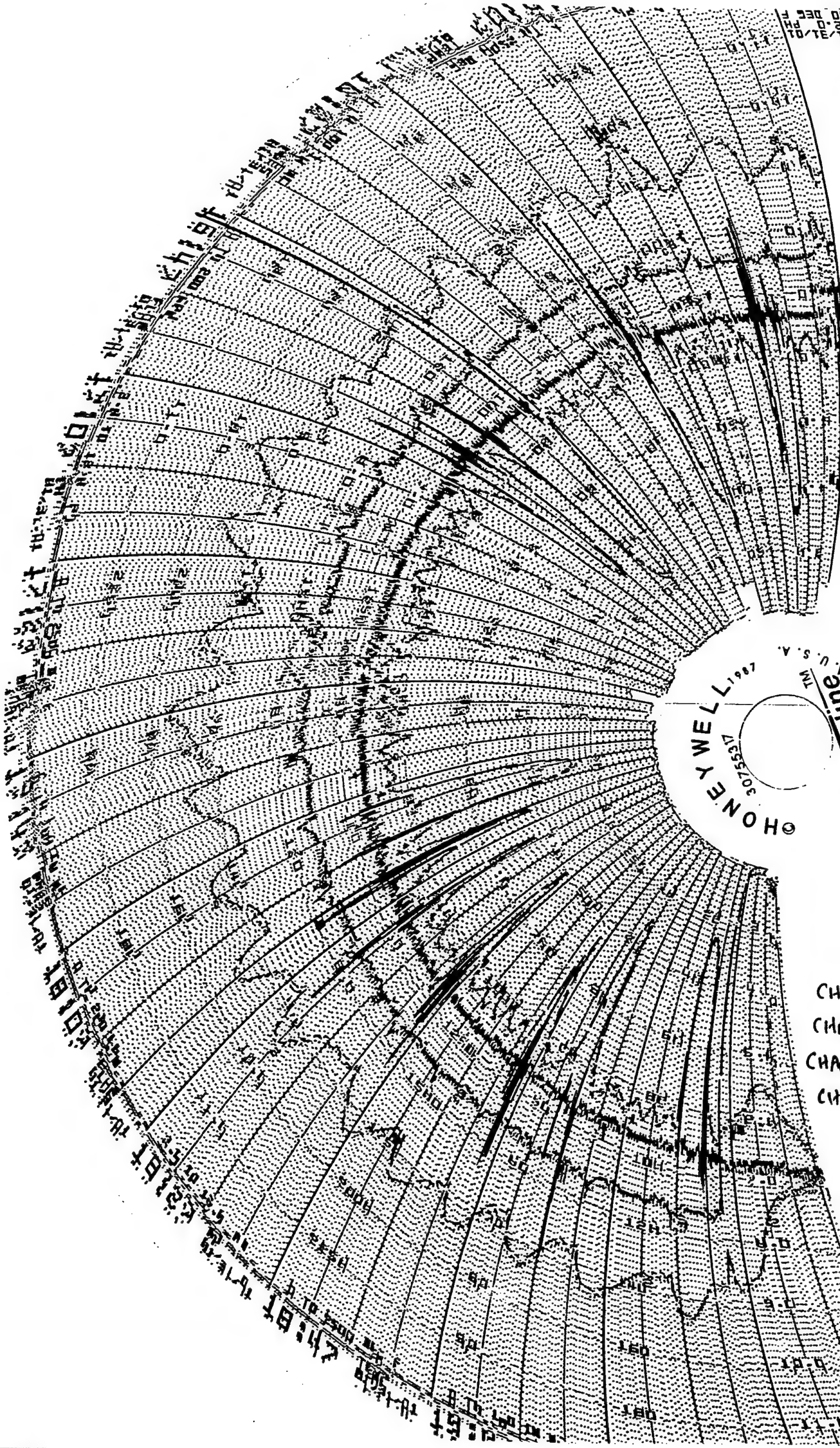
34

INCINERATOR OPERATION

ERATOR	DATE	TIME	WEIGHT	PRIMARY	SECODNARY	BOXES
Joseph Thomas	2-2-01	111	68	1676	1769	2
Joseph Thomas	2-2-01	124	45	1809	1793	2
[illegible]	2-2-01	138	43	1881	1806	2
[illegible]	2-2-01	148	40	1888	1885	2
[illegible]	2-2-01	200	59	1700	1782	2
[illegible]	2-2-01	210	46	1854	1795	2
[illegible]	2-2-01	228	44	1510	1710	3
[illegible]	2-2-01	238	40	1605	1773	2
[illegible]	2-2-01	258	44	1750	1782	2
[illegible]	2-2-01	302	47	1740	1786	2
[illegible]	2-2-01	312	40	1850	1802	2
[illegible]	2-5-01	758	44	1441	1920	2
[illegible]	2-5-01	810	42	1249	1708	2
[illegible]	2-5-01	820	44	1482	1711	2
[illegible]	2-5-01	829	41	1412	1716	2
[illegible]	2-5-01	839	38	1418	1718	2
[illegible]	2-5-01	849	43	1420	1715	2

760

35

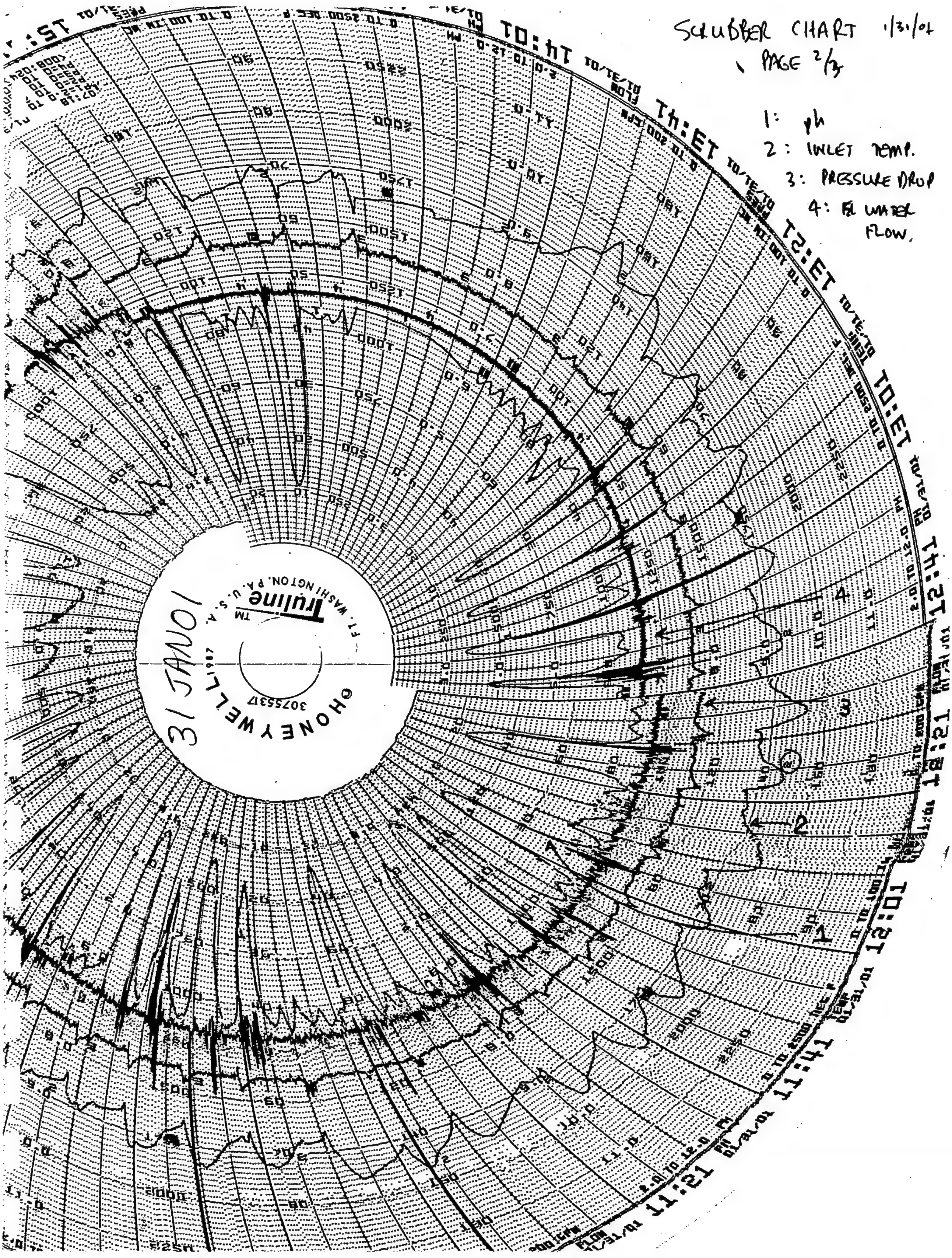


SCRUBBER 1/31/01
CHART
PG. 1/3

CHANNEL 1: pH
CHANNEL 2: INLET TEMP
CHANNEL 3: PRESSURE DROP
CHANNEL 4: WATER FLOW

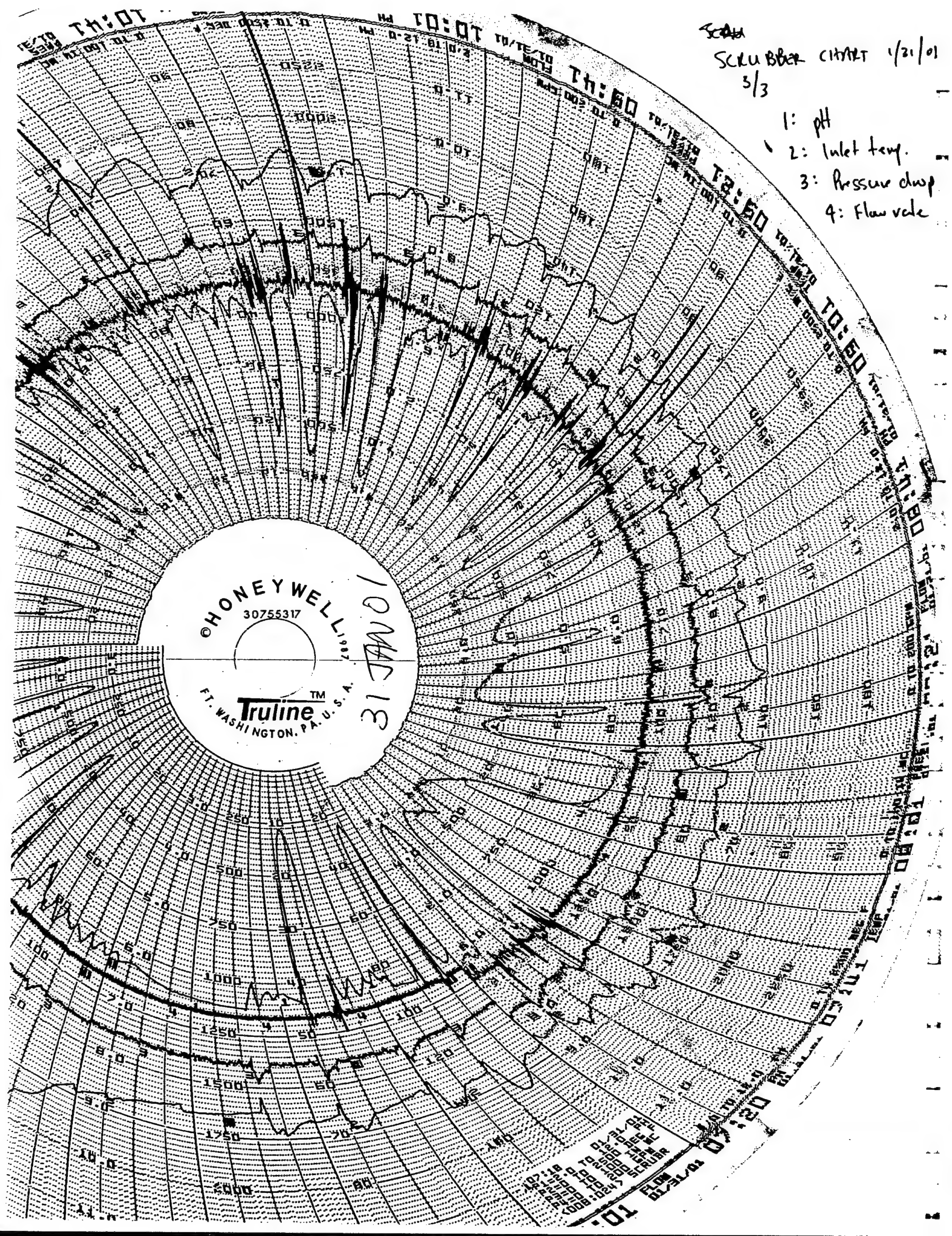
SCRUBBER CHART 1/31/01
PAGE 2/3

1: ph
2: INLET TEMP.
3: PRESSURE DROP
4: FL WATER FLOW.



SCRUBBER CHART 1/31/01
3/3

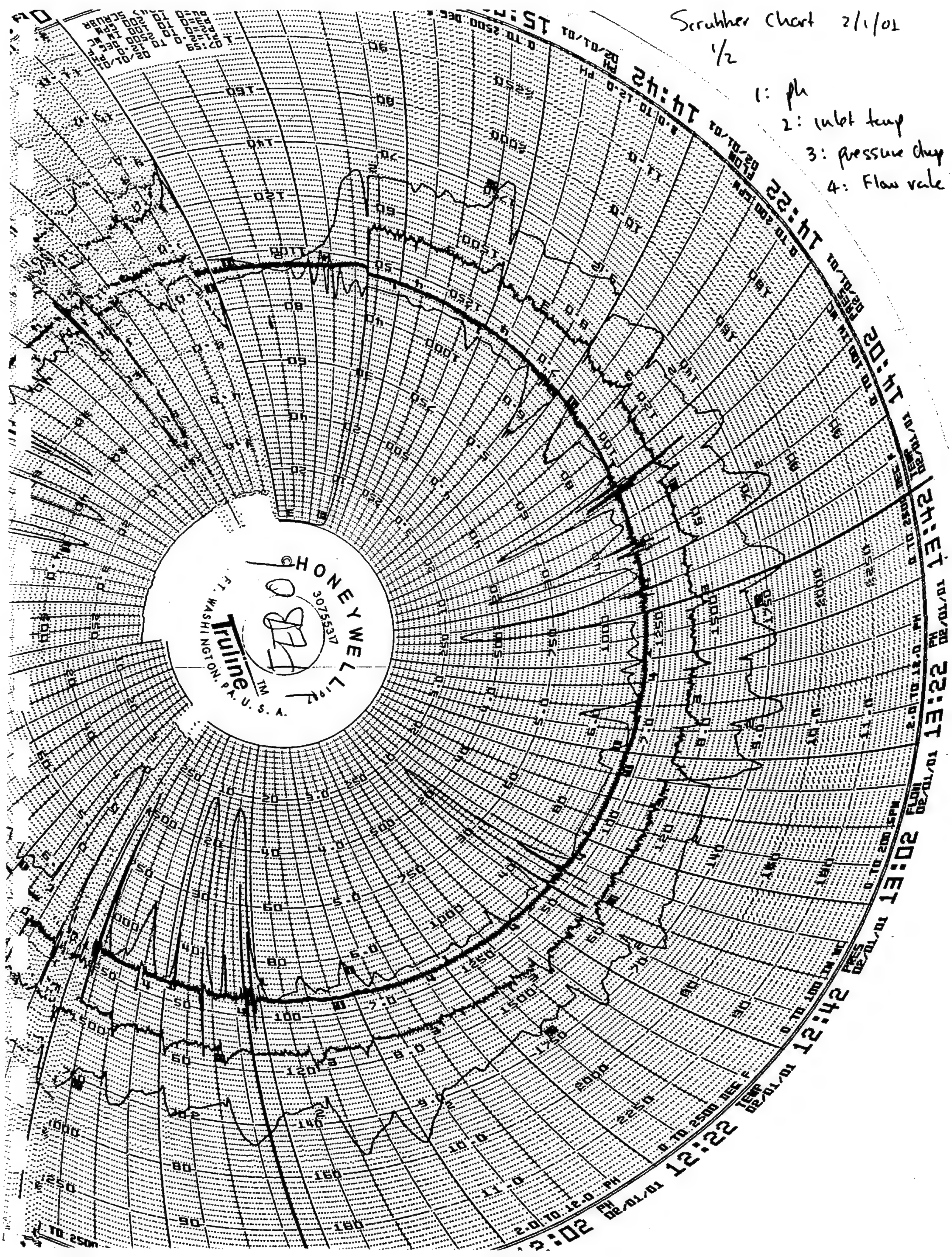
1: pH
2: Inlet temp.
3: Pressure drop
4: Flow rate



Scrubber Chart 2/1/01

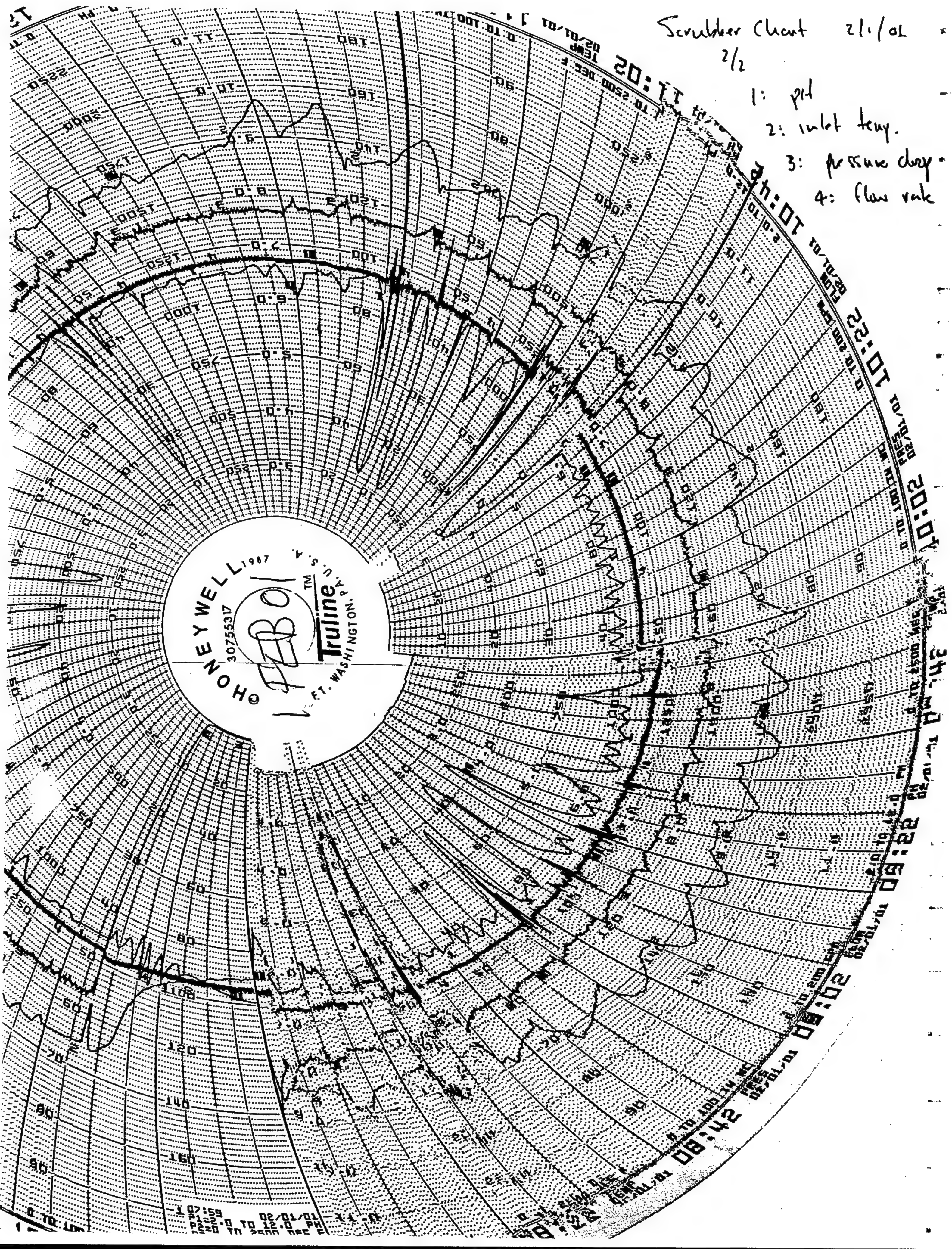
1/2

1: ph
2: inlet temp
3: pressure drop
4: Flow rate



Scrubber Chart 2/1/01
2/2

1: pH
2: inlet temp.
3: pressure drop
4: flow rate



PACIFIC ENVIRONMENTAL SERVICES, INC.

Project No.	Page	of
F181.001	1	3

Client: AAFB

Location: AAFB

Prepared By	Date	Checked By	Date	Sheet Title
		JA	2/2/01	#1

Time	Scrubber Water pH
9:50	6.3
9:55	5.8
10:00	6.5
10:05	6.5
10:10	6.6
10:15	6.5
10:20	6.6
10:25	6.0
10:30	3.3
10:35	6.2
10:40	6.6
10:45	6.6
10:50	6.2
11:00	6.5

PACIFIC ENVIRONMENTAL SERVICES, INC.

Project No.	Page	of
F181.001	2	3

Client: AAFB

Location: AAFB

Prepared By	Date	Checked By	Date	Sheet Title
			2/2/01	#2

Time	① PH (5)	② Inlet temp (10)	③ Pressure (10) Drop	④ Flow rate (10 GPM
12:30	3.0	1706	56.9	93.3
12:35	3.2			
12:40	3.5	1650	58.8	93.8
12:45	2.8			
12:50	3.1	1724	57.0	92.6
12:55	3.0			
1:00	3.3	1701	57.3	93.0
1:05	3.0			
1:10	3.2	1650	56.9	93.0
1:15	3.2			
1:20	3.5	1713	55.4	93.1
1:25	6.4	1810	56.9	92.9
1:30	6.4	1759	56.4	92.7

PACIFIC ENVIRONMENTAL SERVICES, INC.

Project No.	Page	of
F181.001	3	3

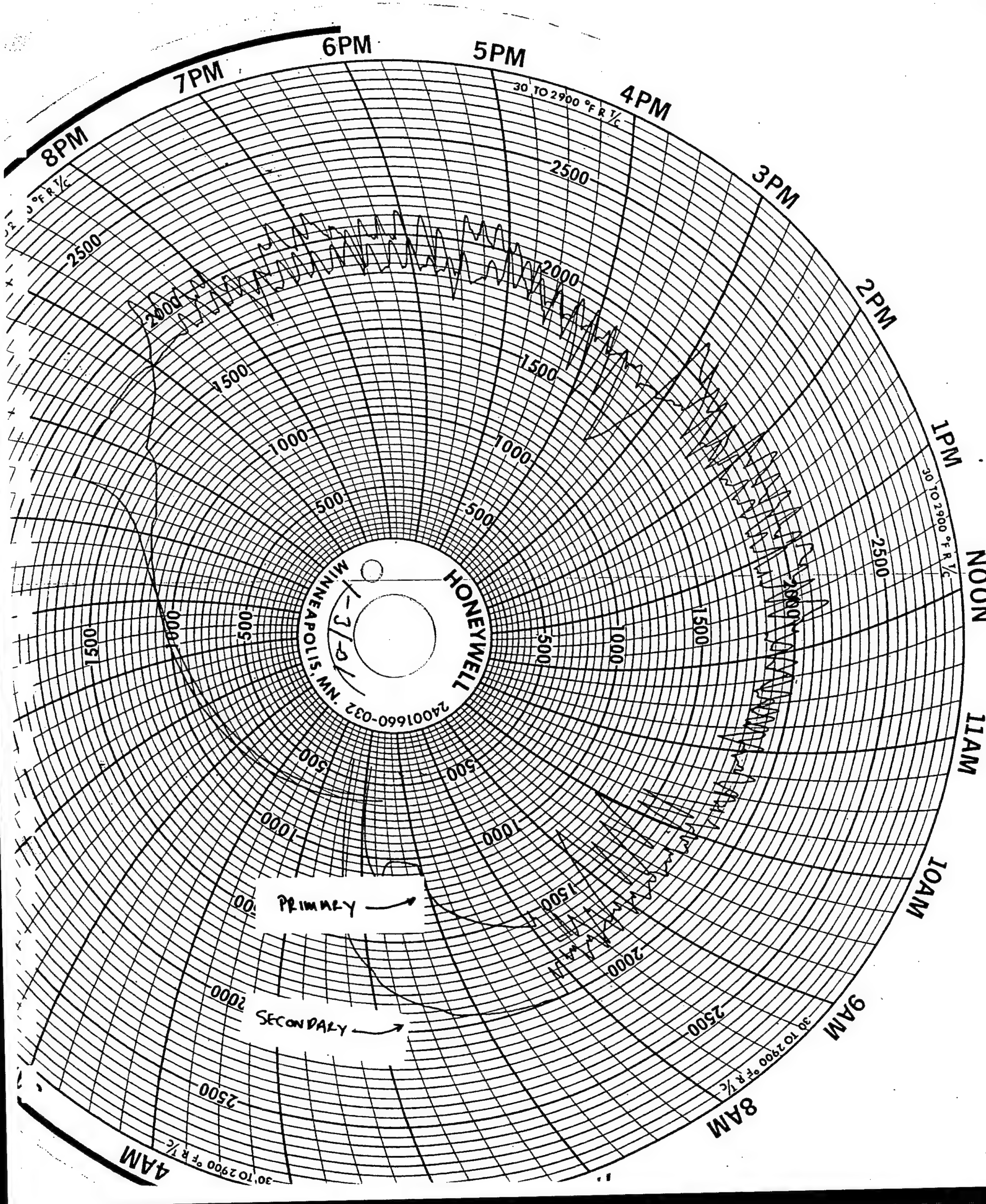
Client
AAFB

Location
AAFB

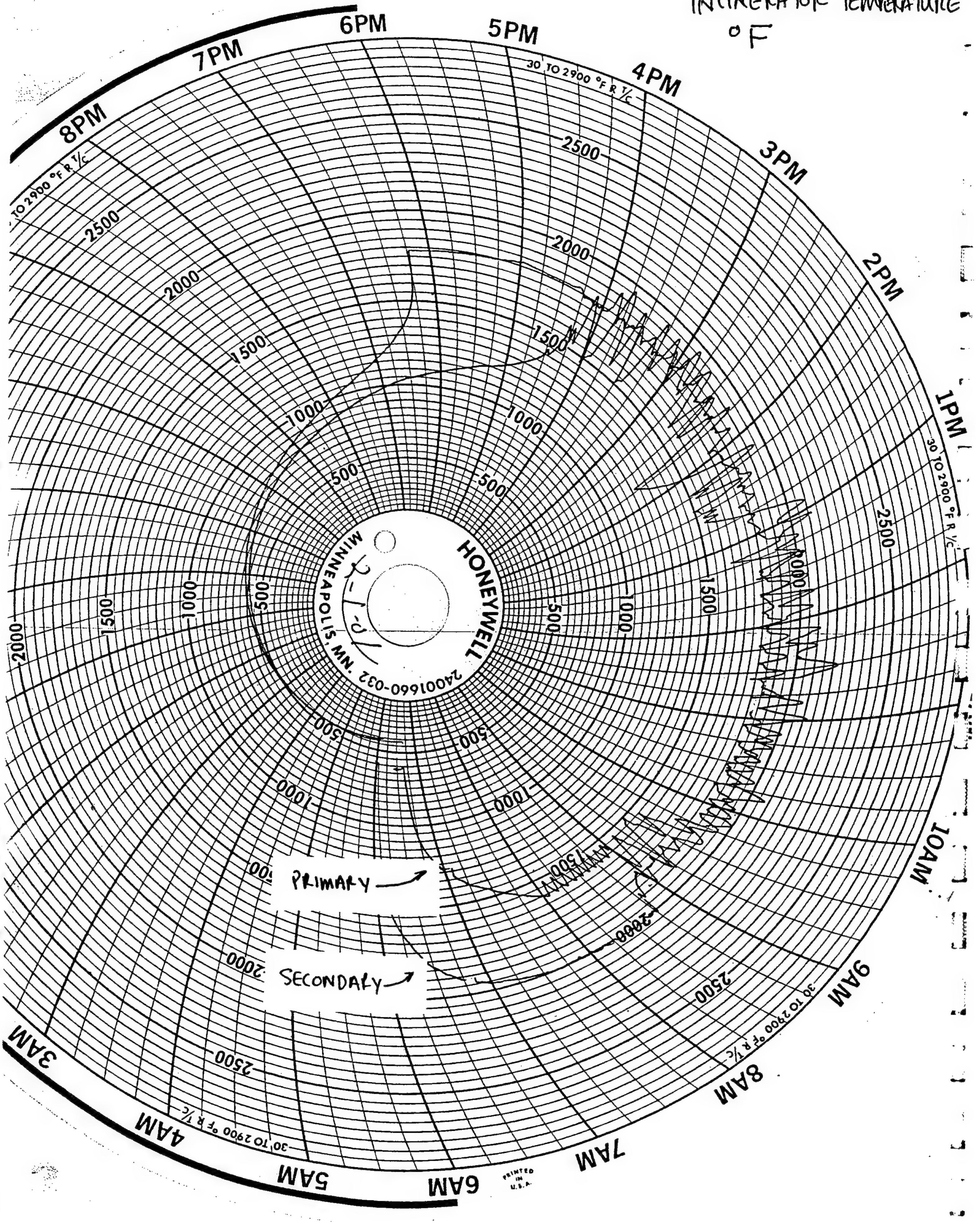
Prepared By	Date	Checked By	Date	Sheet Title
		[illegible]	3/2/01	#3

Time	PH	inlet temp	Pressure Drop	Flow rate
2:05	5.9	1715	55.9	92.6
2:10	4.3	1673	58.7	93.1
2:15	5.0	1773	56.1	91.2
2:20	6.6	1697	55.8	92.8
2:25	6.5	1675	55.3	92.7
2:30	6.5	1694	55.8	93.0
2:35	6.6	1678	55.5	92.7
2:40	5.7	1845	55.6	91.4
2:45	6.7	1697	55.6	93.3
2:50	6.6	1652	56.7	92.8
2:55	4.6	1812	55.1	96.9
3:00	6.7	1683	56.1	93.1
3:05	5.7	1834	55.4	92.9

INCINERATOR TEMPERATURE
°F

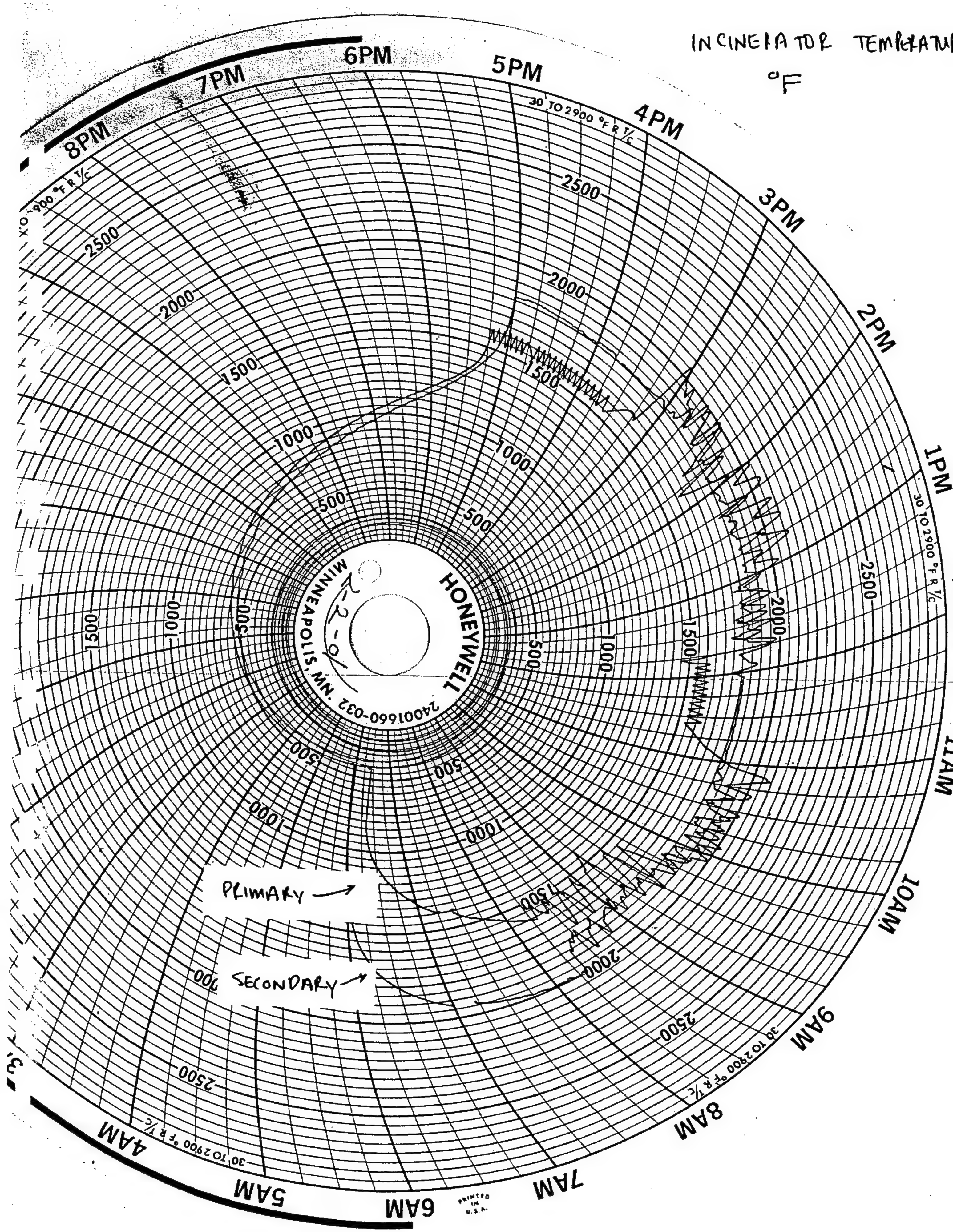


INCINERATOR TEMPERATURE
°F



INCINERATOR TEMPERATURE

°F



1-26-01 1:23 pm scrubble Turn on

Did not begin on 1-29-01 set up for testing the stack

INCINERATOR OPERATION

ERATOR	DATE	TIME	WEIGHT	PRIMARY	SECODNARY	BOXES
Joseph Thomas	1-26-01	1054	38	1504	1809	2
	1-26-01	1110	42	1481	1777	2
	1-26-01	1124	38	1619	1803	2
	1-26-01	1135	40	1662	1797	2
	1-26-01	1155	40	1695	1785	2
	1-26-01	127	44	1406	1778	2
	1-26-01	134	46	1500	1768	2
	1-26-01	149	38	1163	1734	2
	1-26-01	159	41	1444	1752	2
	1-26-01	209	38	1625	1783	2
	1-31-01	818	48	1451	1934	2
	1-31-01	828	43	1455	1754	2
	1-31-01	838	45	1532	1770	2
	1-31-01	850	43	1547	1767	2
	1-31-01	920	38	1058	1768	2
	1-31-01	932	40	1275	1725	2
	1-31-01	950	38	1215	1726	2

700

30

APPENDIX B
RAW FIELD DATA

Appendix B.1
Raw Field Data
Particulate Matter/Metals (M29)

TRAVERSE POINT LOCATION FOR CIRCULAR DUCTS

Plant: Andrews AFB

Date: 01-31-01

Sampling Location: stack

Inside of Far Wall to Outside of Nipple: 17 3/8"

Inside of Near Wall to Outside of Nipple (Nipple Length): 2"

Stack I.D.: 15 3/8

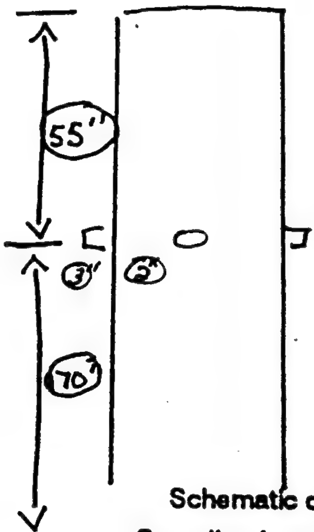
Distance Downstream from Flow Disturbance (Distance B):

170" inches / Stack I.D. = 11.05 dd

Distance Upstream from Flow Disturbance (Distance A):

55" inches / Stack I.D. = 3.58 dd

Calculated By: Dennis D. Holzschuh



Schematic of Sampling Location

Traverse Point Number	Fraction of Length	Length (inches)	Product of Columns 2 & 3 (To nearest 1/8")	Nipple Length (inches)	Traverse Point Location (Sum of Col. 4 & 5)
A 1	.044	15 3/8"	5/8"	2	A 2 5/8" B 3 5/8"
2	.146	15 3/8"	2 1/4"	2	4 1/4" 5 1/4"
3	.296	15 3/8"	4 1/2"	2	6 1/2" 7 1/2"
4	.704	15 3/8"	10 7/8"	2	12 7/8" 13 7/8"
5	.854	15 3/8"	13 1/8"	2	15 1/8" 16 1/8"
6	.956	15 3/8"	14 3/4"	2	16 3/4" 17 3/4"

PACIFIC ENVIRONMENTAL SERVICES, INC.

Central Park West
5001 South Miami Boulevard, P.O. Box 12077
Research Triangle Park, North Carolina 27709
(919) 941-0333 FAX: (919) 941-0234

YAW ANGLE CHECK (EPA Method 1) & GAS VELOCITY (EPA Method 2)

Facility: Andrews Air Force Base

Sampling Location: Stack

Run # M2-1

Barometric Pressure, (in. Hg): 29.9

Moisture, (%): ~ 35%

Dry Molecular weight, (g/g-mol):

Stack Diameter or Side 1 Dimension, (in.): 15 3/8"

Project No.: F181-001

Date: ~~[illegible]~~ 01/31/01

Clock Time: 0815-0830

Operators: DDH

Static Pressure, in H_2O: +.15

Pitot Tube, Cp: .84

Side 2: ——

Traverse Point No.	Yaw Angle (°)	Velocity Head In. H_2O	Stack Temp (°F)
A 1	0	.35	170
2	0	.26	170
3	0	.32	170
4	0	.43	170
5	0	.44	170
6	0	.45	171
B 1	0	.35	170
2	0	.42	170
3	0	.44	170
4	0	.49	170
5	0	.48	170
6	0	.42	170

FIELD DATA SHEET

Plant: Andrews AFB
Sampling Location: Stack
Run Number: M29-1 Date: 02-02-01
Pretest Leak Rate: .001 cfm @ 15 in. Hg.
Pretest Leak Check: Pitot: ✓ Orsat: N/A

Sample Type: M29 Operator: DDH
Pbar: 29.9 Ps: +.15
CO2: 5 O2: 12
Probe Length/Type: 3' - Glass Pitot #: PP-19
Stack Diameter: 15 3/8" As: 185.78
K = 5.00

Nozzle ID: .310 Thermocouple #: RT-6
Assumed Bws: ~32 Filter #: 104-007
Meter Box #: AMB-15 Y: 0.995 ΔH@: 1.80
Post-Test Leak Rate: 0.001 cfm @ 15 in. Hg.
Post-Test Leak Check: Pitot: ✓ Orsat: N/A

Traverse Point Number	Sampling Time (min)	Clock Time (24-hour clock)	Gas Meter Reading (Vm) ft³	Velocity Head (Δp) in H2O	Orifice Pressure Differential (ΔH) in H2O Desired	Orifice Pressure Differential (ΔH) in H2O Actual	Stack Temp. (Ts)	Temperature °F Probe	Temperature °F Filter	Impinger Temp. °F	Dry Gas Meter Temp. Inlet (Tm in °F)	Dry Gas Meter Temp. Outlet (Tm out °F)	Pump Vacuum (in. Hg)
A 1	0	0945	805.550										
2	5	0950	809.102	.34	1.70	1.70	172	251	252	48	100	101	3
3	10	0955	813.469	.35	1.75	1.75	172	252	251	48	100	101	3
4	15	1000	817.210	.34	1.70	1.70	172	253	251	48	100	100	3
5	20	1005	820.905	.35	1.75	1.75	171	252	251	49	101	101	3
6	25	1010	824.606	.35	1.75	1.75	172	252	251	49	102	101	3
B 1	30	1015	828.210	.36	1.80	1.80	171	251	251	49	102	101	3
2	35	1025	831.840	.35	1.75	1.75	171	252	252	49	102	102	3
3	40	1030	835.530	.32	1.60	1.60	171	251	251	48	102	102	3
4	45	1035	838.905	.32	1.60	1.60	172	252	251	49	103	103	3
5	50	1040	842.610	.34	1.70	1.70	171	253	251	49	103	102	3
6	55	1045	845.812	.34	1.70	1.70	171	251	250	46	103	103	3
	60	1050	849.400	.34	1.70	1.70	171	251	250	46	103	102	3

ΔVm= ______ $\overline{\sqrt{\Delta p}}$= ______ $\overline{\Delta H}$= ______ $\overline{Ts}$= ______ $\overline{Tm}$= ______

MULTI-METALS SAMPLE RECOVERY DATA

PACIFIC ENVIRONMENTAL SERVICES, INC.

Plant: Andrews AFB MD	Run No.: M29-1
Date: 02/07/01 Sample Box No.:	Job No.: F101-001
Sample Location: Incinerator Outlet	
Sample Type: M29	
Sample Recovery Person: MDM	

Container	Description	Volume, ml	Sealed/Level Marked
Front Half			
1	Filter No.(s) 164.007		
2	Acetone Rinse		
3	Nitric Rinse		
Back Half			
4	Nitric Rinse - Imp. 1,2,3, + Back 1/2 Filter		
5A	Nitric Rinse - Impinger No. 4		
5B	KMNO4/H2O Rinse - Impingers 5 & 6		
5C	HCl Rinse - Impingers 5 & 6		

Moisture Data

Impinger No.	Contents	Initial Volume, ml	Weight, grams Initial	Final	Net
1	K.O.	0	616.8	828.1	211.3
2	HNO_3	100	751.1	855.0	103.9
3	HNO_3	100	634.1	658.1	24.0
4	MT	0	629.6	633.2	3.6
5	$KMnO_4$	100	728.5	730.8	2.3
6	$KMnO_4$	100	721.1	721.9	0.8
7	Si Gel	-	913.1	922.1	9
Total					354.9

Comments:

FIELD DATA SHEET

Plant: Andrews AFB
Sampling Location: Stack
Run Number: M29-2 Date: 02-02-01
Pretest Leak Rate: 0.002 cfm @ 15 in. Hg.
Pretest Leak Check: Pitot: ✓ +3" Orsat: N/A

Sample Type: M29 Operator: DDH
Pbar: 29.90 Ps: + .14
CO2: 5 O2: 12
Probe Length/Type: 3'-Glass Pitot #: RP-19
Stack Diameter: $13\frac{3}{8}$" As: 185.78 K = 5.0

Nozzle ID: .310 Thermocouple #: RT-6
Assumed Bws: 32 Filter #: 104-003
Meter Box #: AMB-15 Y: .995 ΔH@: 1.80
Post-Test Leak Rate: 0.001 cfm @ 15 in. Hg.
Post-Test Leak Check: Pitot: ✓ Orsat: N/A

Traverse Point Number	Sampling Time (min)	Clock Time (24-hour clock)	Gas Meter Reading (Vm) ft³	Velocity Head (Δp) in H2O	Orifice Pressure Differential (ΔH) in H2O Desired	Orifice Pressure Differential (ΔH) in H2O Actual	Stack Temp. (Ts)	Temperature °F Probe	Temperature °F Filter	Impinger Temp. °F	Dry Gas Meter Temp. Inlet (Tm in °F)	Dry Gas Meter Temp. Outlet (Tm out °F)	Pump Vacuum (in. Hg)
A 1	0	1230	849.500										
2	5	1235	852.210	.34	1.70	1.70	172	252	251	49	104	104	2
3	10	1240	855.900	.35	1.75	1.75	172	253	251	50	104	103	2
4	15	1245	859.480	.35	1.75	1.75	171	252	251	50	104	104	2
5	20	1250	863.090	.33	1.65	1.65	172	253	251	50	104	103	2
6	25	1255	866.615	.36	1.80	1.80	172	252	251	50	104	102	2
B 1	30/0	1300	870.200	.36	1.80	1.80	172	252	251	51	104	103	2
2	35	1310	873.961	.35	1.75	1.75	171	252	252	52	104	104	2
3	40	1315	877.300	.35	1.75	1.75	171	252	251	51	104	104	2
4	45	1320	880.750	.28	1.40	1.40	171	252	251	52	104	102	2
5	50	1325	884.010	.28	1.40	1.40	172	253	250	52	104	102	2
6	55	1330	887.720	.34	1.70	1.70	172	252	251	50	104	103	2
	60	1335	891.530	.37	1.85	1.85	172	251	250	50	103	102	2

ΔVm= ______ $\overline{\sqrt{\Delta p}}$= ______ $\overline{\Delta H}$= ______ $\overline{Ts}$= ______ $\overline{Tm}$= ______

MULTI-METALS SAMPLE RECOVERY DATA

PES PACIFIC ENVIRONMENTAL SERVICES, INC.

Plant: Annapolis AFB MD		Run No.: M29-2
Date: 02/02/01	Sample Box No.:	Job No.: F181.002
Sample Location: Incinerator Outlet		
Sample Type: Method 29		
Sample Recovery Person: MDM		

Container	Description	Volume, ml	Sealed/Level Marked
Front Half			
1	Filter No.(s) 104-003		
2	Acetone Rinse		
3	Nitric Rinse		
Back Half			
4	Nitric Rinse - Imp. 1,2,3, + Back 1/2 Filter		
5A	Nitric Rinse - Impinger No. 4		
5B	KMNO4/H2O Rinse - Impingers 5 & 6		
5C	HCl Rinse - Impingers 5 & 6		

Moisture Data

Impinger No.	Contents	Initial Volume, ml	Weight, grams		
			Initial	Final	Net
1	KO	0	643.2	776.5	133.3
2	HNO3	100	~~621.0~~ 713.0	828.6	115.6
3	HNO3	100	759.5	816.7	57.2
4	MT	0	523.8	536.1	12.3
5	KMnO4	100	760.6	768.7	8.1
6	KMnO4	100	732.8	734.1	1.3
7	Si gel	-	1016.6	1027.9	11.3
Total					339.1

Comments:

FIELD DATA SHEET

Plant: Andrews AFB
Sampling Location: Stack
Run Number: M29-3 Date: 02-02-01
Pretest Leak Rate: .002 cfm @ 15 in. Hg.
Pretest Leak Check: Pitot: ✓ Orsat: N/A

Sample Type: M29 Operator: DDH
Pbar: 29.9 Ps: +.15
CO2: 5 O2: 12
Probe Length/Type: 8.0-19 Pitot #: 3' 6 loss
Stack Diameter: 15 3/8" As: 1.85
K=5.000

Nozzle ID: .310 Thermocouple #: RT-6
Assumed Bws: 28 Filter #: 104-005
Meter Box #: RMB-15 Y: .995 ΔH@: 1.85
Post-Test Leak Rate: .004 cfm @ 15 in. Hg.
Post-Test Leak Check: Pitot: ✓ Orsat: N/A

Traverse Point Number	Sampling Time (min)	Clock Time (24-hour clock)	Gas Meter Reading (Vm) ft³	Velocity Head (Δp) in H2O	Orifice Pressure Differential (ΔH) in H2O Desired	Orifice Pressure Differential (ΔH) in H2O Actual	Stack Temp. (Ts)	Temperature °F Probe	Temperature °F Filter	Impinger Temp. °F	Dry Gas Meter Temp. Inlet (Tm in °F)	Dry Gas Meter Temp. Outlet (Tm out °F)	Pump Vacuum (in. Hg)
A 1	0	1405	891.600										
2	5	1410	894.800	.30	1.50	1.50	170	250	251	48	101	101	2
3	10	1415	899.150	.36	1.80	1.80	171	252	252	49	102	102	2
4	15	1420	903.860	.35	1.75	1.75	172	253	250	49	103	102	3
5	20	1425	907.640	.35	1.75	1.75	172	252	251	49	103	102	3
6	25	1430	911.305	.34	1.70	1.70	171	251	251	49	104	102	3
B 1	30/0	1435	915.160	.34	1.70	1.70	171	252	250	49	104	102	3
2	35	1445	918.650	.35	1.75	1.75	172	253	251	51	104	103	3
3	40	1450	922.322	.35	1.75	1.75	171	252	250	52	103	103	3
4	45	1455	926.817	.38	1.90	1.90	172	254	251	51	103	102	3
5	50	1500	929.991	.37	1.85	1.85	172	253	252	52	104	103	3
6	55	1505	934.020	.34	1.70	1.70	172	252	251	51	104	103	3
	60	1510	938.050	.34	1.70	1.70	172	251	251	52	104	104	3

ΔVm= ______ $\overline{\sqrt{\Delta p}}$= ______ $\overline{\Delta H}$= ______ $\overline{Ts}$= ______ $\overline{Tm}$= ______

MULTI-METALS SAMPLE RECOVERY DATA

PACIFIC ENVIRONMENTAL SERVICES, INC.

Plant: Andrews AFB		Run No.: M29-3
Date:	Sample Box No.:	Job No.:
Sample Location:		
Sample Type:		
Sample Recovery Person:		

Container	Description	Volume, ml	Sealed/Level Marked
Front Half			
1	Filter No.(s) 104-005		
2	Acetone Rinse		
3	Nitric Rinse		
Back Half			
4	Nitric Rinse - Imp. 1,2,3, + Back 1/2 Filter		
5A	Nitric Rinse - Impinger No. 4		
5B	KMNO4/H2O Rinse - Impingers 5 & 6		
5C	HCl Rinse - Impingers 5 & 6		

Moisture Data

Impinger No.	Contents	Initial Volume, ml	Weight, grams Initial	Final	Net
1	K.O.	0	619.4	723.0	103.6
2	HNO_3	100	747.2	858.4	111.2
3	HNO_3	100	638.0	712.9	74.9
4	K.O.	0	630.7	651.6	20.9
5	$KMnO_4$	100	729.5	748.1	18.6
6	$KMnO_4$	100	719.1	725.4	6.3
7	Si Gel	-	922.0	942.9	20.9
Total					356.4

Comments:

Appendix B.2

Raw Field Data

Dioxins/Furans (M23)

PACIFIC ENVIRONMENTAL SERVICES, INC.

Central Park West
5001 South Miami Boulevard, P.O. Box 12077
Research Triangle Park, North Carolina 27709
(919) 941-0333 FAX: (919) 941-0234

US EPA M23 FIELD DATA SHEET

Plant: Andrews AFB
Sampling Location: stack
Run Number: M23-1 Date: 01/31/01
Pretest Leak Rate: 0.010 cfm @ 15" in. Hg
Pretest Leak Check: Pitot: ✓ +3" Orsat: N/A

Sample Type: M23 Operator(s): DSH
P_{bar}: 29.90 P_s: +.15
CO_2: 5 O_2: 12.0
Probe Length/Type: 3' Glass Pitot #: RP-19
Stack Diameter: 15 3/8" A_s: 185.78
K ~~4.343~~
K ~~4.486~~ (R) 4.745

Nozzle ID: XXIV - .310 Thermocouple No.: RTC
Assumed B_{ws}: ~3.5% Filter No.: DF
Meter Box No.: RMB-15 γ: .995 ΔH@: 1.80
Posttest Leak Rate: 0.010 cfm @ 15" in. Hg
Posttest Leak Check Rate: Pitot: N/A Orsat: ✓

Traverse Point Number	Sampling Time (min)	Clock Time (24-hr)	Gas Meter Reading (V_m, ft³)	Velocity Head (ΔP, in H_2O)	Orifice Pressure Differential (ΔH, in H_2O) Desired	Actual	Stack Temp (°F)	Probe Temp (°F)	Filter Temp (°F)	Impinger Temp (°F)	XAD Temp (°F)	Dry Gas Meter Temperature (°F) Inlet	Outlet	Pump Vacuum (in. Hg)
A 1	0	1026	232.290											
	5	1031	235.850	.34	1.43	1.43	170	250	250	48	48	87	87	3
	10	1036	239.264	.35	1.47	1.47	170	247	251	49	48	88	88	3
	15	1041	242.564	.34	1.43	1.43	170	248	252	49	49	88	88	3
2	20/0	1046	246.123	.35	1.47	1.47	170	249	251	49	49	88	88	3
	25	1051	249.564	.35	1.47	1.47	170	249	252	50	51	88	88	3
	30	1056	252.010	.36	1.51	1.51	170	251	252	50	51	88	88	3
	35	1101	255.560	.36	1.51	1.51	170	251	252	51	51	88	88	3
3	40/0	1106	258.900	.39	1.64	1.64	170	252	250	48	48	88	88	3
	45	1111	261.815	.32	1.34	1.34	171	251	251	49	49	88	88	3
	50	1116	265.200	.35	1.47	1.47	171	252	251	49	49	88	88	3
	55	1121	268.650	.36	1.51	1.51	171	252	251	49	50	88	89	3
4	60/0	1126	272.000	.36	1.51	1.51	171	252	254	51	51	88	88	3
	65	1131	275.342	.36	1.51	1.51	171	252	251	52	51	88	89	3
	70	1136	278.900	.37	1.55	1.51	171	251	253	51	51	88	88	3
	75	1141	282.400	.37	1.55	1.55	171	252	254	51	50	88	89	3
5	80	1146	286.000	.36	1.51	1.51	171	252	253	51	51	88	89	3
	85	1151	290.643	.36	1.51	1.51	171	253	251	51	51	88	89	3
	90	1156	294.000	.36	1.72	1.72	171	253	251	51	51	88	89	3
	95	1201	298.000	.36	1.72	1.72	171	253	251	51	51	88	89	3
6	100	1206	301.165	.36	1.63	1.63	171	252	251	52	52	88	88	3
	105	1211	305.675	.34	1.54	1.54	171	252	252	51	51	88	88	3
	110	1216	309.000	.33	1.49	1.49	172	251	251	51	52	88	88	3

ΔV_m:______ Δp:______ ΔH:______ T_s:______ T_m:______

PACIFIC ENVIRONMENTAL SERVICES, INC.

Central Park West
5001 South Miami Boulevard, P.O. Box 12077
Research Triangle Park, North Carolina 27709
(919) 941-0333 FAX: (919) 941-0234

US EPA M23 FIELD DATA SHEET

Plant: Andrews AFB
Sampling Location: stack
Run Number: M23-1 Date: 01/31/01
Pretest Leak Rate: 0.010 cfm @ 15 in. Hg
Pretest Leak Check: Pitot: ✓ +3'' Orsat: NA

Sample Type: M23 Operator(s): DDH
P_{bar}: 29.9 P_s: +.15
CO_2: 5% O_2: 12%
Probe Length/Type: 5'/Glass Pitot #: RP-19
Stack Diameter: 15 3/8'' A_s: 185.78

Nozzle ID: -310 Thermocouple No.: RT6
Assumed B_{ws}: ~3% Filter No.: DF
Meter Box No.: RMB-5 Y: 0.995 ΔH@: 1.80
Posttest Leak Rate: 0.010 cfm @ 15 in. Hg
Posttest Leak Check Rate: Pitot: ✓ +3'' Orsat: NA

4.245

Traverse Point Number	Sampling Time (min)	Clock Time (24-hr)	Gas Meter Reading (V_m, ft^3)	Velocity Head (ΔP, in H_2O)	Orifice Pressure Differential (ΔH, in H_2O) Desired	Actual	Stack Temp (°F)	Probe Temp (°F)	Filter Temp (°F)	Impinger Temp (°F)	XAD Temp (°F)	Dry Gas Meter Temperature (°F) Inlet	Outlet	Pump Vacuum (in. Hg)
	115	1221	313.043	.40	1.81	1.81	170	251	254	50	50	88	88	7
B 1	120	1226	319.480	.34	1.48	1.48	171	252	253	51	50	88	88	7
	125	1255	322.720	.31	1.41	1.41	171	252	254	52	50	90	82	7
	130	1300	326.342	.32	1.45	1.45	173	251	251	51	50	91	90	7
	135	1305	329.545	.36	1.64	1.64	172	253	250	52	51	90	90	7
2	140	1310	333.430	.39	1.77	1.77	171	253	254	52	51	90	90	7
	145	1315	337.453	.40	1.82	1.82	172	253	250	52	52	91	90	7
	150	1320	340.980	.40	1.82	1.82	172	254	251	52	52	91	91	7
	155	1325	343.953	.32	1.45	1.45	173	254	254	51	51	90	90	7
3	160	1330	347.341	.35	1.59	1.59	173	254	254	51	52	91	91	7
	165	1335	351.078	.35	1.59	1.59	173	252	251	52	52	92	91	7
	170	1340	354.456	.36	1.64	1.64	172	253	250	53	52	92	92	7
	175	1345	357.986	.35	1.59	1.59	172	253	251	53	53	93	92	7
4	180	1350	361.500	.35	1.59	1.59	172	252	251	52	52	93	92	7
	185	1355	364.900	.34	1.55	1.55	172	252	251	51	51	93	92	7
	190	1400	368.240	.34	1.56	1.56	171	253	252	52	52	93	93	7
	195	1405	372.042	.35	1.60	1.60	171	252	251	52	51	93	92	7
5	200	1410	375.786	.36	1.65	1.65	171	252	252	52	51	93	92	7
	205	1415	379.453	.35	1.60	1.60	171	252	251	52	52	93	93	7
	210	1420	382.900	.35	1.60	1.60	172	252	252	52	52	93	93	7
	215	1425	386.900	.36	1.65	1.65	172	252	252	51	51	92	93	7
6	220	1430	389.960	.36	1.65	1.65	172	250	246	52	51	92	92	7

ΔV_m: ____ Δp: ____ ΔH: ____ T_s: ____ T_m: ____

PACIFIC ENVIRONMENTAL SERVICES, INC.

C… Park West
5001 South Miami Boulevard, P.O. Box 12077
Research Triangle Park, North Carolina 27709
(919) 941-0333 FAX: (919) 941-0234

US EPA M23 FIELD DATA SHEET

Plant: Andrews AFB
Sampling Location: stack
Run Number: M23-1 Date: 01/31/01
Pretest Leak Rate: 0.010 cfm @ 15 in. Hg
Pretest Leak Check: Pitot: ✓ Orsat: N/A

Sample Type: M23 Operator(s): DDH
P_{bar}: 29.9 P_s: +.15
CO_2: 5 O_2: 12
Probe Length/Type: 3' Glass Pitot #: RP-19
Stack Diameter: 15 3/8 A_s: 185.78

Nozzle ID: XXIV .310 Thermocouple No.: RT-6
Assumed B_{ws}: ~3% Filter No.: DF
Meter Box No.: RMB-15 Y: .995 ΔH@: 1.80
Posttest Leak Rate: 0.010 cfm @ 15 in. Hg
Posttest Leak Check Rate: Pitot: ✓ Orsat: N/A

K = 4.745

Traverse Point Number	Sampling Time (min)	Clock Time (24-hr)	Gas Meter Reading (V_m, ft^3)	Velocity Head (ΔP, in H_2O)	Orifice Pressure Differential (ΔH, in H_2O)		Stack Temp (°F)	Probe Temp (°F)	Filter Temp (°F)	Impinger Temp (°F)	XAD Temp (°F)	Dry Gas Meter Temperature (°F)		Pump Vacuum (in. Hg)
					Desired	Actual						Inlet	Outlet	
			393.810											
	225	1435	~~394.055~~	.36	1.605	1.605	172	251	248	48	48	93	94	7
	230	1440	397.740	.36	1.605	1.605	171	252	249	48	49	93	93	7
	235	1445	401.342	.33	1.51	1.51	171	251	247	49	49	93	92	7
	240	1450	405.021	.34	1.56	1.56	172	252	250	49	48	93	93	7

ΔV_m:______ Δp:______ ΔH:______ T_s:______ T_m:______

PACIFIC ENVIRONMENTAL SERVICES, INC.

Central Park West
5001 South Miami Boulevard, P.O. Box 12077
Research Triangle Park, North Carolina 27709
(919) 941-0333 FAX: (919) 941-0234

Sample Train Recovery Data
EPA Method 23

Facility: Andrews AFB - MD
Project No.: F181.001
Date: 1/30/01
Run No.: M23-1
Clean-up person: MDM
Sampling Location: Incinerator Outlet
Field Team Leader: MDM
Samplers: DDH, JF, MDM
Comments:

Front-Half Data

Filter No.: un-numbered Filter Media: G/F Tare Wt (mg):

Filter No.: Filter Media: Tate Wt (mg):

Back-Half Data

	XAD-2 Sorbent Resin Trap	Knock-out Impinger	Impinger No. 1
Contents:	XAD-2 Sorbent Resin	MT	100 ml HPLC H_2O
Final mass (g):	326.5	791.5	583.2
Initial mass (g):	308.8	495.7	584.3
Net Mass (g)	17.7	295.8	(1.1)

	Impinger No. 2	Impinger No. 3	Impinger No. 4
Contents:	100 ml HPLC H_2O	MT	Silica Gel
Final mass (g):	683.5	643.7	1081.4
Initial mass (g):	684.9	640.9	1015.7
Net Mass (g)	(1.4)	2.8	65.7

Total Moisture Collected: (g): 1,390.2

Description of Impinger Catch: F 800.7 F 787.1

F 841.3

Impinger #2 I 461.1 No 3 I 496.1 No 4 I 461.2

Net. 380.2 304.6 325.9

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Central Park West
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(919) 941-0333 FAX: (919) 941-0234

US EPA M23 FIELD DATA SHEET

Plant: Andrews AFB
Sampling Location: Stack
Run Number: M23-2 Date: 01/31/01
Pretest Leak Rate: 0.009 cfm @ 15 in. Hg
Pretest Leak Check: Pitot: ✓ Orsat: N/A

Sample Type: M23 Operator(s): DDH
P_{bar}: 29.9 P_s: + .15
CO_2: 5 O_2: 12
Probe Length/Type: 3' Glass Pitot #: RP-19
Stack Diameter: 15 3/8" A_s: 185.78

Nozzle ID: ~~XXIV~~ .310 Thermocouple No.: RT6
Assumed B_{ws}: ~~[illegible]~~ ~32 Filter No.: DF
Meter Box No.: RMB-5 Y: .995 ΔH@: 1.80
Posttest Leak Rate: 0.009 cfm @ 15 in. Hg
Posttest Leak Check Rate: Pitot: +3" ✓ Orsat: N/A

K= 4.745 K= 5.45625 MDM

Traverse Point Number	Sampling Time (min)	Clock Time (24-hr)	Gas Meter Reading (V_m, ft³)	Velocity Head (ΔP, in H_2O)	Orifice Pressure Differential (ΔH, in H_2O) Desired	Actual	Stack Temp (°F)	Probe Temp (°F)	Filter Temp (°F)	Impinger Temp (°F)	XAD Temp (°F)	Dry Gas Meter Temperature (°F) Inlet	Outlet	Pump Vacuum (in. Hg)
A 1	0	1610	400.115											
	[illegible]	1615	410.102	.34	1.63	1.63	171	254	251	49	47	89	89	6
	10	1620	414.107	.34	1.61	1.61	171	254	252	49	47	89	89	6
	15	1625	418.109	.34	1.61	1.61	171	252	251	49	47	89	89	6
2	20	1640	421.096	.34	1.61	1.61	171	252	251	49	47	89	89	6
	25	1645	424.460	.36	1.61	1.61	172	253	251	48	48	100	100	6
	30	1650	427.890	.36	1.70	1.70	172	253	251	48	48	100	100	6
	35	1655	431.325	.33	1.56	1.56	172	252	251	49	48	101	100	6
3	40	1700	434.850	.34	1.61	1.61	172	252	251	50	50	102	102	6
	45	1705	438.40	.34	1.61	1.61	172	252	251	50	50	102	102	6
	50	1710	441.609	.35	1.66	1.66	172	253	252	51	51	102	102	6
	55	1715	445.300	.34	1.61	1.61	172	252	250	52	50	102	102	6
4	60	1720	449.017	.34	1.61	1.61	172	252	250	51	50	102	102	6
	65	1735	453.260	.34	1.61	1.61	172	252	250	52	52	102	102	6
	70	1740	457.140	.34	1.61	1.61	172	253	251	51	51	102	102	6
	75	1745	460.680	.36	1.70	1.70	172	253	252	51	51	103	104	6
5	80	1750	464.250	.35	1.66	1.66	172	253	251	52	52	103	104	6
	85	1755	468.270	.35	1.90	1.90	173	252	251	51	51	108	104	6
	90	1800	473.171	.30	1.64	1.64	173	252	251	52	52	108	104	6
	95	1805	476.910	.35	1.90	1.90	173	252	251	52	52	108	104	6
6	100	1810	480.130	.37	2.01	2.01	172	252	251	52	52	108	105	6
	105	1815	484.140	.37	2.01	2.01	172	251	252	52	50	108	105	6
	110	1820	487.702	.36	1.96	1.96	172	252	252	51	51	108	106	6

ΔV_m:____ Δp:____ ΔH:____ T_s:____ T_m:____

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PACIFIC ENVIRONMENTAL SERVICES, INC.

Central Park West
5001 South Miami Boulevard, P.O. Box 12077
Research Triangle Park, North Carolina 27709
(919) 941-0333 FAX: (919) 941-0234

US EPA M23 FIELD DATA SHEET

Plant: Andrews AFB
Sampling Location: Stack
Run Number: M23-2 Date: 01/31/01
Pretest Leak Rate: 0.009 cfm @ 15 in. Hg
Pretest Leak Check: Pitot: ✓ Orsat: N/A

Sample Type: M23 Operator(s): DDH
P_{bar}: 29.9 P_s: +.15
CO_2: 5 O_2: 12
Probe Length/Type: 3'-Glass Pitot #: RP-19
Stack Diameter: 15 3/8 A_s: 185.78

Nozzle ID: [illegible]-.310 Thermocouple No.: RT-6
Assumed B_{ws}: .32 Filter No.: DF
Meter Box No.: RMB-15Y: .995 ΔH@: 1.80
Posttest Leak Rate: 0.010 cfm @ 15 in. Hg
Posttest Leak Check Rate: Pitot: ✓ Orsat: N/A

K=5.45675 K=5.80

Traverse Point Number	Sampling Time (min)	Clock Time (24-hr)	Gas Meter Reading (V_m, ft^3)	Velocity Head (ΔP, in H_2O)	Orifice Pressure Differential (ΔH, in H_2O) Desired	Actual	Stack Temp (°F)	Probe Temp (°F)	Filter Temp (°F)	Impinger Temp (°F)	XAD Temp (°F)	Dry Gas Meter Temperature (°F) Inlet	Outlet	Pump Vacuum (in. Hg)
	115	1825	491.670	[illegible]	2.12	2.12	172	251	252	46	45	108	107	7
[illegible]	120/0	1830	495.550	.[illegible]	1.96	1.96	171	253	251	46	45	108	106	7
	125	1840	499.430	.3[illegible]	1.74	1.74	172	252	251	46	45	108	107	7
	130	1845	502.910	.32	1.74	1.74	172	252	251	47	46	108	107	7
	135	1850	506.400	.32	1.74	1.74	171	251	251	47	46	108	108	7
2	140	1855	510.150	.34	1.[illegible]	1.86	172	[illegible]	250	47	47	107	108	7
	145	1900	514.000	.34	1.86	1.86	172	252	251	46	47	107	108	7
	150	1905	518.100	.35	2.03	2.03	172	251	250	46	47	107	106	7
	155	1910	521.900	.37	2.14	2.14	172	252	250	47	47	107	107	7
3	160	1915	526.217	.35	2.03	2.03	172	251	251	48	47	108	108	7
	165	1920	529.740	.35	2.03	2.03	172	252	252	48	47	108	108	7
	170	1925	533.680	.33	1.91	1.91	172	252	250	48	48	108	107	7
	175	1930	537.520	.33	1.91	1.91	172	252	251	48	47	108	108	7
4	180	1935	541.630	.38	2.20	2.20	172	253	251	48	47	108	107	7
	185	1945	545.802	.38	2.08	2.08	172	253	252	48	48	108	108	7
	190	1950	549.510	.38	2.20	2.20	171	252	251	48	48	109	108	7
	195	1955	553.210	.31	1.79	1.79	171	252	251	48	49	109	109	7
5	200	2000	556.500	.31	1.79	1.79	171	252	252	48	49	109	109	10
	205	2005	560.017	.26	1.50	1.50	171	251	250	48	48	109	110	10
	210	2010	563.405	.26	1.50	1.50	170	252	251	48	49	109	110	10
	215	2015	567.012	.26	1.50	1.50	172	252	251	48	49	109	110	10
[illegible]	220	2020	570.280	.27	1.56	1.56	172	251	251	48	49	109	109	10

ΔV_m:____ Δp:____ ΔH:____ T_s:____ T_m:____

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US EPA M23 FIELD DATA SHEET

Plant: Andrews AFB
Sampling Location: Stack
Run Number: M23-2 Date: 01/31/01
Pretest Leak Rate: 0.009 cfm @ 15 in. Hg
Pretest Leak Check: Pitot: ✓ +3" Orsat: N/A

Sample Type: M23 Operator(s): DDH
P_{bar}: 29.9 P_s: -.15
CO_2: 5 O_2: 12
Probe Length/Type: 3' Glass Pitot #: RP-19
Stack Diameter: 15 3/8" A_s: 185.78

Nozzle ID: XXIV .310 Thermocouple No.: RT-6
Assumed B_{ws}: 32 Filter No.: DF
Meter Box No.: RMB-15 γ: .995 ΔH@: 1.80
Posttest Leak Rate: 0.009 cfm @ 15 in. Hg
Posttest Leak Check Rate: Pitot: ✓ Orsat: N/A

Traverse Point Number	Sampling Time (min)	Clock Time (24-hr)	Gas Meter Reading (V_m, ft^3)	Velocity Head (ΔP, in H_2O)	Orifice Pressure Differential (ΔH, in H_2O)		Stack Temp (°F)	Probe Temp (°F)	Filter Temp (°F)	Impinger Temp (°F)	XAD Temp (°F)	Dry Gas Meter Temperature (°F)		Pump Vacuum (in. Hg)
					Desired	Actual						Inlet	Outlet	
	225	2025	574.010	.30	1.74	1.74	172	252	251	49	48	109	109	10
	230	2030	577.210	.30	1.74	1.74	171	251	250	49	48	109	109	10
	235	2035	580.802	.31	1.79	1.79	171	252	251	49	49	109	108	10
	240	2040	581.155	.31	1.79	1.79	172	252	251	49	49	109	108	10

ΔV_m:____ Δp:____ ΔH:____ T_s:____ T_m:____

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Sample Train Recovery Data
EPA Method 23

Facility: Andrews AFB - MD
Project No.: F181.001
Date: 1/31/01
Run No.: M23-2
Clean-up person: MDM
Sampling Location: Incinerator Outlet
Field Team Leader: MDM
Samplers: MDM, JF, DDH
Comments:

Front-Half Data

Filter No.: un-numbered Filter Media: G/F Tare Wt (mg):

Filter No.: Filter Media: Tate Wt (mg):

Back-Half Data

	XAD-2 Sorbent Resin Trap	Knock-out Impinger	Impinger No. 1
Contents:	XAD-2 Sorbent Resin	MT	100 ml HPLC H_2O
Final mass (g):	–	654.3	621.8
Initial mass (g):	276.5	464.2	619.8
Net Mass (g)	–	190.1	2.0

	Impinger No. 2	Impinger No. 3	Impinger No. 4
Contents:	100 ml HPLC H_2O	MT	Silica Gel
Final mass (g):	743.7	512.0	943.3
Initial mass (g):	743.6	507.5	883.9
Net Mass (g)	0.1	4.5 ~~13.5~~	59.4

Total Moisture Collected: (g): ~~1190.7~~ 1,256.9

Description of Impinger Catch:

No. 2 F 702.3 No. 3 F 819.0 No. 4 F 787.1

I 461.5 I 464.7 I 461.4

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US EPA M23 FIELD DATA SHEET

Plant: Andrews AFB
Sampling Location: Stack
Run Number: M23-3 Date: 02-01-01
Pretest Leak Rate: 0.008 cfm @ 15 in. Hg
Pretest Leak Check: Pitot: ✓ Orsat: N/A

Sample Type: M23 Operator(s): DDH
P_{bar}: 29.90 P_s: +.14
CO_2: 5 O_2: 12
Probe Length/Type: 3' Glass Pitot #: RP-14
Stack Diameter: 15 3/8" A_s: 185.78

Nozzle ID: .310 Thermocouple No.: RT-6
Assumed B_{ws}: ~32 Filter No.: DF
Meter Box No.: RMB-15 γ: 0.995 ΔH@: 1.80
Posttest Leak Rate: 0.00 cfm @ 15 in. Hg
Posttest Leak Check Rate: Pitot: ✓ Orsat: N/A

(K = 5.00)

Traverse Point Number	Sampling Time (min)	Clock Time (24-hr)	Gas Meter Reading (V_m, ft^3)	Velocity Head (ΔP, in H_2O)	Orifice Pressure Differential (ΔH, in H_2O) Desired	Actual	Stack Temp (°F)	Probe Temp (°F)	Filter Temp (°F)	Impinger Temp (°F)	XAD Temp (°F)	Dry Gas Meter Temperature (°F) Inlet	Outlet	Pump Vacuum (in. Hg)
A 1	0	0910	584.200											
	5	0915	587.775	.35	1.75	1.75	~~252~~ 171	252	249	49	49	96	96	6
	10	0920	591.243	.36	1.80	1.80	171	252	251	49	49	97	96	6
	15	0925	595.020	.36	1.80	1.80	171	252	251	48	48	97	97	6
2	20/0	0930	598.750	.35	1.75	1.75	171	252	252	48	48	97	98	6
	25	0935	602.301	.38	1.90	1.90	171	252	252	49	48	97	97	6
	30	0940	606.012	.35	1.75	1.75	170	252	252	50	50	97	97	6
	35	0945	609.902	.35	1.75	1.75	172	252	251	50	50	97	97	6
3	40/0	0950	613.820	.32	1.60	1.60	171	251	251	51	50	98	97	6
	45	0955	617.125	.32	1.60	1.60	171	252	251	52	51	98	98	6
	50	1000	620.705	.35	1.75	1.75	171	253	251	52	51	98	97	6
	55	1005	624.387	.36	1.80	1.80	171	253	252	52	52	98	98	6
4	60/0	1010	627.570	.36	1.80	1.80	171	253	252	52	51	99	98	6
	65	1020	631.370	.36	1.80	1.80	171	252	251	52	51	99	98	6
	70	1025	635.200	.36	1.80	1.80	172	252	251	52	51	99	98	6
	75	1030	638.810	.36	1.80	1.80	172	252	251	52	52	99	99	6
5	80/0	1035	642.400	.35	1.75	1.75	172	251	251	52	52	99	98	6
	85	1040	646.035	.35	1.75	1.75	172	252	252	52	52	99	98	6
	90	1045	649.830	.33	1.65	1.65	172	251	251	52	51	99	99	6
	95	1050	653.550	.34	1.70	1.70	172	252	251	52	52	99	99	6
6	100	1055	657.030	.34	1.70	1.70	172	252	251	52	51	99	99	6
	105	1100	660.317	.35	1.75	1.75	172	251	251	51	51	99	99	6
	110	1105	664.135	.35	1.75	1.75	172	251	251	51	51	99	99	6

ΔV_m:____ Δp:____ ΔH:____ T_s:____ T_m:____

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US EPA M23 FIELD DATA SHEET

Plant: Andrews AFB
Sampling Location: Stack
Run Number: M23-3 Date: 02-01-01
Pretest Leak Rate: 0.008 cfm @ 15 in. Hg
Pretest Leak Check: Pitot: ✓ Orsat: N/A (±3.0")

Sample Type: M23 Operator(s): DDH
P_{bar}: 29.9 P_s: + .14
CO_2: 5 O_2: 12
Probe Length/Type: 3' Glass Pitot #: RP-19
Stack Diameter: 15 3/8 A_s: 185.78

Nozzle ID: .310 Thermocouple No.: RT-6
Assumed B_{ws}: ~22 Filter No.: DF
Meter Box No.: RMB-15 γ: 0.995 ΔH@: 1.80
Posttest Leak Rate: .008 cfm @ 15 in. Hg
Posttest Leak Check Rate: Pitot: ✓ Orsat:

[K=5.00]

Traverse Point Number	Sampling Time (min)	Clock Time (24-hr)	Gas Meter Reading (V_m, ft^3)	Velocity Head (ΔP, in H_2O)	Orifice Pressure Differential (ΔH, in H_2O) Desired	Actual	Stack Temp (°F)	Probe Temp (°F)	Filter Temp (°F)	Impinger Temp (°F)	XAD Temp (°F)	Dry Gas Meter Temperature (°F) Inlet	Outlet	Pump Vacuum (in. Hg)
	115	1110	667.870	.37	1.85	1.85	172	253	251	49	48	101	101	7
706 1	120/0	1115	671.546	.37	1.85	1.85	172	252	252	46	47	101	101	7
	125	1135	675.520	.37	1.85	1.85	172	252	251	46	46	101	101	7
	130	1140	679.400	.36	1.80	1.80	172	251	252	47	48	101	102	7
	135	1145	683.145	.36	1.80	1.80	172	251	252	47	48	101	102	7
2	140	1150	687.019	.35	1.75	1.75	172	252	250	47	47	102	102	7
	145	1155	690.730	.35	1.75	1.75	172	251	251	47	47	102	102	7
	150	1200	694.121	.35	1.75	1.75	172	251	251	47	47	101	102	7
	155	1205	697.940	.34	1.70	1.70	172	252	251	47	48	101	101	7
3	160	1210	701.133	.34	1.70	1.70	172	252	251	47	48	101	101	7
	165	1215	705.217	.35	1.75	1.75	172	251	251	47	47	101	101	7
	170	1220	708.860	.35	1.75	1.75	172	252	251	47	47	102	101	7
	175	1225	712.406	.35	1.75	1.75	172	251	251	47	47	102	102	7
4	180	1230	716.030	.36	1.80	1.80	172	252	251	48	47	102	102	7
	185	1235	719.620	.35	1.75	1.75	172	251	251	48	47	102	102	7
	190	1240	724.017	.36	1.80	1.80	172	252	252	48	48	103	102	7
	195	1245	727.217	.36	1.80	1.80	172	252	251	48	47	103	103	7
5	200	1250	730.302	.36	1.80	1.80	172	252	251	48	47	103	102	7
	205	1255	734.001	.32	1.60	1.60	172	252	252	49	48	103	103	7
	210	1300	737.615	.32	1.60	1.60	172	252	251	49	48	103	103	7
	215	1305	–	.32	1.60	1.60	172	250	251	49	49	103	102	7
6	220	1310	–	0.32	1.60	1.60	172	251	251	50	49	103	102	7

ΔV_m: ______ Δp: ______ ΔH: ______ T_s: ______ T_m: ______

FIELD DATA SHEET

Plant: Andrews AFB
Sampling Location: Incinerator Outlet
Run Number: M23-3 Date: 2/1/01
Pretest Leak Rate: 0.008 cfm @ 15 in. Hg.
Pretest Leak Check: Pitot: — Orsat: N/A

Sample Type: Method 23 Operator: DMA/MMM
Pbar: 29.9 Ps: + 0.14
CO2: ~5 O2: ~12
Probe Length/Type: 3'-glass Pitot #: PP-A
Stack Diameter: 15 3/8 As: ____

Nozzle ID: 0.310 Thermocouple #: RT-6
Assumed Bws: ~25 Filter #: Un-numbered
Meter Box #: ~~0.995~~ TMB-15 Y: ~~1.80~~ 0.995 ΔH@: 1.80
Post-Test Leak Rate: 0.03 cfm @ 12 in. Hg.
Post-Test Leak Check: Pitot: — Orsat: N/A

Traverse Point Number	Sampling Time (min)	Clock Time (24-hour clock)	Gas Meter Reading (Vm) ft³	Velocity Head (Δp) In H2O	Orifice Pressure Differential (ΔH) in H2O Desired	Orifice Pressure Differential (ΔH) in H2O Actual	Stack Temp. (Ts)	Temperature °F Probe	Temperature °F Filter	Impinger Temp. °F	Dry Gas Meter Temp. Inlet (Tm in °F) XAD	Dry Gas Meter Temp. Outlet (Tm out °F)	Pump Vacuum (in. Hg)
6	225	1315	751.0	0.32	1.6	1.6	173	250	241	50	49	103 / 102	7.5
	230	1320	755.6	0.32	1.6	1.6	172	250	252	50	49	103 / 102	7
	235	1325	759.8	0.33	1.65	1.65	172	249	252	52	49	104 / 102	7
	240	1330	764.382	0.32	1.6	1.6	171	250	252	54	51	104 / 103	7

ΔVm= ____ $\overline{\sqrt{\Delta p}}$= ____ $\overline{\Delta H}$= ____ $\overline{Ts}$= ____ $\overline{Tm}$= ____

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Sample Train Recovery Data
EPA Method 23

Facility: Andrews AFB - MD
Project No.: F181.001
Date:
Run No.: M23-3
Clean-up person: MDM
Sampling Location:
Field Team Leader: MDM
Samplers: DVH, JF, MDM
Comments:

Front-Half Data

Filter No.: un-numbered Filter Media: G/F Tare Wt (mg):
Filter No.: Filter Media: Tate Wt (mg):

Back-Half Data

	XAD-2 Sorbent Resin Trap	Knock-out Impinger	Impinger No. 1
Contents:	XAD-2 Sorbent Resin	MT	100 ml HPLC H_2O
Final mass (g):	320.0	824.8	578.8
Initial mass (g):	305.4	495.6	582.8
Net Mass (g)		329.2	

	Impinger No. 2	Impinger No. 3	Impinger No. 4
Contents:	100 ml HPLC H_2O	MT	Silica Gel
Final mass (g):	739.8	633.4	1083.2
Initial mass (g):	740.9	628.7	1024.0
Net Mass (g)			

Total Moisture Collected: (g):

Description of Impinger Catch:

No. 2 F 814.6 No. 3 F 729.1 ~~7~~491.9

I ~~461.5~~ 464.1 I 496.3 461.4

Appendix B.3
Raw Field Data
Hydrogen Chloride

PES

M26

~~VOLATILE ORGANIC SAMPLING~~ TRAIN ~~(VOST)~~ SAMPLING DATA

COMPANY: Andrews AFB
CITY: Washington DC
DATE: 01/31/01
LOCATION: Stack
TIME: 1145
RUN #: M26-1
METER #: VB-6
Y-FACTOR: 1.004
BAROMETRIC PRESSURE, in. Hg: 29.9
OPERATOR: DDH
AMBIENT TEMPERATURE, °F:
PURGE TIME:

LEAK CHECK DATA

	Vacuum Initial, (in. Hg)	Vacuum Final, (in. Hg)	Time, (min.)
Pre-test:	15" ✓	15" ✓	
Post-test:	15"	15" ✓	

Sample Time (min)	Clock Time, (24-hr)	Meter Volume, (liter)	Rotometer Setting	Dry Gas Meter Temp., (°F)	Vacuum, (in. Hg)	WC
0	10:45	1323.00	2.0	87	2	2.2
5	10:50	1333.35	2.0	87	2	2.2
10	10:55	1343.12	2.0	87	3	2.2
15	11:00	1353.21	2.0	88	3	2.2
20	11:05	1363.19	2.0	88	2	2.2
25	11:10	1373.31	2.0	88	3	2.2
30	11:15	1383.10	2.0	91	3	2.2
35	11:20	1393.70	2.0	91	3	2.2
40	11:25	1403.10	2.0	92	3	2.2
45	11:30	1413.21	2.0	92	3	2.2
50	11:35	1423.10	2.0	92	3	2.2
55	11:40	1433.01	2.0	92	3	2.2
60	11:45	1443.10				

Nitrogen purge/activated carbon packing in sample holding container:

$$V_{std} = V_m(\text{liters}) \times Y \times 17.647 \times \frac{P_b\,(\text{in. Hg})}{T_m\,(^\circ R)}$$

$V_{std} =$

PES

VOLATILE ORGANIC SAMPLING TRAIN (VOST) SAMPLING DATA

COMPANY: Andrews AFB CITY: DC
DATE: 01/31/01 LOCATION: Stack
TIME: 1610 RUN #: M26-2
METER #: VB-6 Y-FACTOR: 1.004
BAROMETRIC PRESSURE, in. Hg: 29.9 OPERATOR: DDH
AMBIENT TEMPERATURE, °F: ______ PURGE TIME: 10

LEAK CHECK DATA

ABORTED RUN

	Vacuum Initial, (in. Hg)	Vacuum Final, (in. Hg)	Time, (min.)
Pre-test:	15	15	✓
Post-test:	15	15	

Run Aborted

Sample Time (min)	Clock Time, (24-hr)	Meter Volume, (liter)	Rotometer Setting	Dry Gas Meter Temp., (°F)	Vacuum, (in. Hg)
0	1610	1443.93	2.0 LPM	89	3
5	1615	1453.87		89	3
10	1620	1463.81		90	3
15	1625	1473.72		90	3
20	1630	1483.81		91	3
25	1635	1493.21		91	3
	1640	1503.17		91	3
	1645	1513.21		91	3
	1650	1523.20		91	3
	1655	1533.17		91	3
	1700	1543.22		91	3
	1705	1553.17		91	

1710 1563.22

Nitrogen purge/activated carbon packing in sample holding container: ______

$$V_{std} = V_m(\text{liters}) \times Y \times 17.647 \times \frac{P_b\,(\text{in. Hg})}{T_m(°R)}$$

V_{std} =

.40 .35

PES

VOLATILE ORGANIC SAMPLING TRAIN (VOST) SAMPLING DATA

COMPANY: Andrews AFB
DATE: ~~01/31/01~~ 02/01/01
TIME: 0910 - 1010
METER #: VB-6
BAROMETRIC PRESSURE, in. Hg: 29.90
AMBIENT TEMPERATURE, °F: 100

CITY: Washington DC
LOCATION: Stack
RUN #: M26-~~1~~ 2
Y-FACTOR: 1.004
OPERATOR: DDH
PURGE TIME:

LEAK CHECK DATA

	Vacuum Initial, (in. Hg)	Final, (in. Hg)	Time, (min.)
Pre-test:	15"	15"	✓
Post-test:	15"	15"	✓

Sample Time (min)	Clock Time, (24-hr)	Meter Volume, (liter)	Rotometer Setting	Dry Gas Meter Temp., (°F)	Vacuum, (in. Hg)	WC
0	0910	1565.55	2.0 (LPM)	108	3	2.2
5	0915	1575.60	2.0	108	3	2.2
10	0920	1585.41	2.0	108	3	2.2
15	0925	1595.23	2.0	109	3	2.2
20	0930	1605.17	2.0	109	3	2.2
25	0935	1615.29	2.0	109	3	2.2
30	0940	1625.42	2.0	110	3	2.2
35	0945	1635.50	2.0	110	3	2.2
40	0950	1645.40	2.0	110	3	2.2
45	0955	1655.32	2.0	110	3	2.2
50	1000	1665.19	2.0	110	3	2.2
55	1005	1675.29	2.0	110	3	2.2
60	1010	1685.36	~~2.0~~	~~110~~	~~3~~	

~~450.40~~ .34 l/ft 1.91

Nitrogen purge/activated carbon packing in sample holding container:

$$V_{std} = V_m(\text{liters}) \times Y \times 17.647 \times \frac{P_b(\text{in. Hg})}{T_m(^\circ R)}$$

V_{std} =

VOLATILE ORGANIC SAMPLING TRAIN (VOST) SAMPLING DATA

COMPANY: Andrews AFB
CITY: Washington DC
DATE: 02-02-01
LOCATION: stack
TIME:
RUN #: M26-~~4~~ 3
METER #: VB-6
Y-FACTOR: 1.004
BAROMETRIC PRESSURE, in. Hg: 29.9
OPERATOR: DDH
AMBIENT TEMPERATURE, °F: 89
PURGE TIME:

LEAK CHECK DATA

	Vacuum Initial, (in. Hg)	Final, (in. Hg)	Time, (min.)
Pre-test:			
Post-test:			

Sample Time (min)	Clock Time, (24-hr)	Meter Volume, (liter)	Rotometer Setting	Dry Gas Meter Temp., (°F)	Vacuum, (in. Hg)
0	0945	2.0	1707.00	88	3
5	0950	2.0	1717.12	88	3
10	0955	2.0	1727.09	85	3
15	1000	2.0	1737.10	89	3
20	1005	2.0	1747.21	89	3
25	1010	2.0	1757.19	90	3
30	1015	2.0	1767.23	90	3
35	1025	2.0	1777.19	90	3
40	1030	2.0	1787.26	90	3
45	1035	2.0	1797.31	91	3
50	1040	2.0	1807.21	91	3
55	1045	2.0	1817.32	91	3
(60)	1050	2.0	1827.44		

Nitrogen purge/activated carbon packing in sample holding container:

$$V_{std} = V_m(\text{liters}) \times Y \times 17.647 \times \frac{P_b(\text{in. Hg})}{T_m(^\circ R)}$$

V_{std} =

Appendix B.4

Raw Field Data

CO_2, O_2, SO_2, NO_x, CO CEMS (M3A, M6C, 7E, 10)

Malcolm Grow Medical Center - Andrews AFB, MD

Medical Waste Incinerator

CEM Responses

M23-1

Date	Time	O2	CO2
31-Jan-01	11:13:15	10.055	5.659
31-Jan-01	11:14:15	10.784	5.529
31-Jan-01	11:15:15	10.336	5.245
31-Jan-01	11:16:15	10.981	5.02
31-Jan-01	11:17:15	12.067	4.993
31-Jan-01	11:18:15	12.374	5.198
31-Jan-01	11:19:15	12.5	5.507
31-Jan-01	11:20:15	12.865	5.801
31-Jan-01	11:21:15	13.414	6.02
31-Jan-01	11:22:15	13.929	6.115
31-Jan-01	11:23:15	9.623	6.085
31-Jan-01	11:24:15	8.689	6.001
31-Jan-01	11:25:15	10.295	5.856
31-Jan-01	11:26:15	9.827	5.673
31-Jan-01	11:27:15	10.649	5.545
31-Jan-01	11:28:15	11.78	5.621
31-Jan-01	11:29:00	11	6
31-Jan-01	11:30:00	11.75	6
31-Jan-01	11:31:00	12.25	6.4
31-Jan-01	11:32:00	12.5	6.4
31-Jan-01	11:33:00	13	6.4
31-Jan-01	11:34:00	13.75	6.4
31-Jan-01	11:35:00	13.5	6.4
31-Jan-01	11:36:00	9.25	6.4
31-Jan-01	11:37:00	10	6.4
31-Jan-01	11:38:00	9.5	6
31-Jan-01	11:39:00	10.5	6.4
31-Jan-01	11:40:00	12	6.4
31-Jan-01	11:41:45	13.415	6.409
31-Jan-01	11:42:45	13.613	6.541
31-Jan-01	11:43:45	10.964	6.566
31-Jan-01	11:44:45	9.35	6.505
31-Jan-01	11:45:45	10.111	6.359
31-Jan-01	11:46:45	10.108	6.168
31-Jan-01	11:47:45	10.864	5.954
31-Jan-01	11:48:45	11.596	5.818
31-Jan-01	11:49:45	12.179	5.81
31-Jan-01	11:50:45	12.615	5.94
31-Jan-01	11:51:45	12.534	6.132
31-Jan-01	11:52:45	12.736	6.301
31-Jan-01	11:53:45	13.047	6.403

Malcolm Grow Medical Center - Andrews AFB, MD

Medical Waste Incinerator

CEM Responses

M23-1

Date	Time	O2	CO2
31-Jan-01	11:54:45	13.338	6.433
31-Jan-01	11:55:45	10.8	6.388
31-Jan-01	11:56:45	8.601	6.28
31-Jan-01	11:57:45	7.645	6.134
31-Jan-01	11:58:45	8.61	5.967
31-Jan-01	11:59:45	9.654	5.805
31-Jan-01	12:00:45	10.38	5.718
31-Jan-01	12:01:45	10.679	5.768
31-Jan-01	12:02:45	11.02	6.021
31-Jan-01	12:03:45	11.119	6.388
31-Jan-01	12:04:45	11.522	6.76
31-Jan-01	12:05:45	11.932	6.779
31-Jan-01	12:06:45	8.933	8.359
31-Jan-01	12:07:45	8.012	9.079
31-Jan-01	12:08:45	9.739	8.005
31-Jan-01	12:09:45	11.224	6.74
31-Jan-01	12:10:45	11.445	6.448
31-Jan-01	12:11:45	11.565	6.301
31-Jan-01	12:12:45	11.925	5.998
31-Jan-01	12:13:45	12.256	5.73
31-Jan-01	12:14:45	12.547	5.517
31-Jan-01	12:15:45	10.502	7.305
31-Jan-01	12:16:45	9.121	8.283
31-Jan-01	12:17:45	9.61	7.726
31-Jan-01	12:18:45	9.988	7.513
31-Jan-01	12:19:45	10.988	6.74
31-Jan-01	12:20:45	11.583	6.253
31-Jan-01	12:21:45	11.924	5.946
31-Jan-01	12:22:45	12.01	5.871
31-Jan-01	12:23:45	12.073	5.767
31-Jan-01	12:24:45	12.134	5.719
31-Jan-01	12:25:45	12.145	5.738
31-Jan-01			
31-Jan-01	12:27:48	12.242	5.641
31-Jan-01	12:28:48	12.423	5.557
31-Jan-01	12:29:48	12.76	5.277
31-Jan-01	12:30:48	12.007	5.786
31-Jan-01	12:31:48	6.936	10.28
31-Jan-01	12:32:48	7.837	9.129
31-Jan-01	12:33:48	9.992	7.577
31-Jan-01	12:34:48	11.469	6.464

Malcolm Grow Medical Center - Andrews AFB, MD

Medical Waste Incinerator

CEM Responses

M23-1

Date	Time	O2	CO2
31-Jan-01	12:35:48	11.682	6.202
31-Jan-01	12:36:48	11.73	6.079
31-Jan-01	12:37:48	11.967	5.846
31-Jan-01	12:38:48	12.083	5.728
31-Jan-01	12:39:48	12.353	5.545
31-Jan-01	12:40:48	12.815	5.239
31-Jan-01	12:41:48	8.464	9.2
31-Jan-01	12:42:48	7.617	9.285
31-Jan-01	12:43:48	8.816	8.44
31-Jan-01	12:44:48	11.097	6.856
31-Jan-01	12:45:48	11.683	6.518
31-Jan-01	12:46:48	11.833	6.536
31-Jan-01	12:47:48	12.445	6.529
31-Jan-01	12:48:48	12.839	6.495
31-Jan-01	12:49:48	13.121	6.4
31-Jan-01	12:50:48	12.778	6.238
31-Jan-01	12:51:48	8.399	6.026
31-Jan-01	12:52:48	8.944	5.809
31-Jan-01	12:53:48	10.595	5.629
31-Jan-01	12:54:48	11.406	5.591
31-Jan-01	12:55:48	12.046	5.871
31-Jan-01	12:56:48	12.483	6.343
31-Jan-01	12:57:48	12.66	6.73
31-Jan-01	12:58:48	12.849	6.906
31-Jan-01	12:59:48	12.907	6.893
31-Jan-01	13:00:48	13.156	6.722
31-Jan-01	13:01:48	13.396	6.487
31-Jan-01	13:02:48	13.774	6.236
31-Jan-01	13:03:48	9.86	6.002
31-Jan-01	13:04:48	10.645	5.796
31-Jan-01	13:05:48	11.49	5.625
31-Jan-01	13:06:48	11.997	5.473
31-Jan-01	13:07:48	12.523	5.411
31-Jan-01	13:08:48	13.028	5.502
31-Jan-01	13:09:48	13.311	5.705
31-Jan-01	13:10:48	13.266	5.884
31-Jan-01	13:11:48	13.717	6.012
31-Jan-01	13:12:48	13.691	6.021
31-Jan-01	13:13:48	7.006	5.962
31-Jan-01	13:14:48	7.752	5.84
31-Jan-01	13:21:28	13.122	6.398

Malcolm Grow Medical Center - Andrews AFB, MD

Medical Waste Incinerator

CEM Responses

M23-1

Date	Time	O2	CO2	
31-Jan-01	13:22:28	13.458	6.662	
31-Jan-01	13:23:28	13.545	6.782	
31-Jan-01	13:24:28	13.678	6.76	
31-Jan-01	13:25:28	13.818	6.627	
31-Jan-01	13:26:28	13.498	6.448	
31-Jan-01	13:27:28	8.847	6.252	
31-Jan-01	13:28:28	10.286	6.042	
31-Jan-01	13:29:28	11.133	5.823	
31-Jan-01	13:30:28	12.002	5.646	
31-Jan-01	13:31:28	12.883	5.498	
31-Jan-01	13:32:28	13.114	5.388	
31-Jan-01	13:33:28	13.604	5.395	
31-Jan-01	13:34:28	13.621	5.488	
31-Jan-01	13:35:28	14.023	5.645	
31-Jan-01	13:36:28	11.906	5.788	
31-Jan-01	13:37:28	7.151	5.875	
31-Jan-01	13:38:28	8.413	5.902	
31-Jan-01	13:39:28	10.824	5.858	
31-Jan-01	13:40:28	12.032	5.772	
31-Jan-01	13:41:28			
31-Jan-01	13:42:28			
31-Jan-01	13:43:28			
31-Jan-01	13:44:28			
31-Jan-01	13:45:28			
31-Jan-01	13:46:28			Cal Check
31-Jan-01	13:47:28			
31-Jan-01	13:48:28			
31-Jan-01	13:49:28			
31-Jan-01	13:50:28			
31-Jan-01	13:51:28			
31-Jan-01	13:52:28			
31-Jan-01	13:53:28	12.621	5.473	
31-Jan-01	13:54:28	12.871	5.265	
31-Jan-01	13:55:28	13.048	5.089	
31-Jan-01	13:56:28	13.23	4.976	
31-Jan-01	13:57:28	13.713	4.601	
31-Jan-01	13:58:28	14.062	4.329	
31-Jan-01	13:59:28	14.146	4.326	
31-Jan-01	14:00:28	9.544	8.492	
31-Jan-01	14:01:28	10.043	7.492	
31-Jan-01	14:02:28	10.03	7.423	

Malcolm Grow Medical Center - Andrews AFB, MD

Medical Waste Incinerator

CEM Responses

M23-1

Date	Time	O2	CO2
31-Jan-01	14:03:28	11.203	6.543
31-Jan-01	14:04:28	11.992	5.932
31-Jan-01	14:05:28	12.75	5.32
31-Jan-01	14:06:28	13.009	5.089
31-Jan-01	14:07:28	13.187	4.976
31-Jan-01	14:08:28	13.815	4.542
31-Jan-01	14:09:28	14.248	4.216
31-Jan-01	14:10:28	14.24	4.178
31-Jan-01	14:11:28	14.347	4.097
31-Jan-01	14:12:28	14.618	3.894
31-Jan-01	14:13:28	14.697	3.828
31-Jan-01	14:14:28	14.873	3.768
31-Jan-01	14:15:28	10.243	7.832
31-Jan-01	14:16:28	9.986	7.5
31-Jan-01	14:17:28	9.246	7.792
31-Jan-01	14:18:28	9.805	7.58
31-Jan-01	14:19:28	11.121	6.548
31-Jan-01	14:20:28	12.251	5.755
31-Jan-01	14:21:28	13.267	4.976
31-Jan-01	14:22:28	13.933	4.482
31-Jan-01	14:23:28	14.08	4.295
31-Jan-01	14:24:28	14.354	4.122
31-Jan-01	14:25:28	14.684	3.864
31-Jan-01	14:26:28	14.592	3.888
31-Jan-01	14:27:28	14.781	3.763
31-Jan-01	14:28:28	15.141	3.581
31-Jan-01	14:29:28	10.97	7.203
31-Jan-01	14:30:28	10.477	7.225
31-Jan-01	14:31:28	9.971	7.284
31-Jan-01	14:32:28	10.297	7.242
31-Jan-01	14:33:28	12.03	5.878
31-Jan-01	14:34:28	13.047	5.137
31-Jan-01	14:35:28	13.439	4.792
31-Jan-01	14:36:28	13.944	4.455
31-Jan-01	14:37:28	14.03	4.358
31-Jan-01	14:38:28	14.324	4.145
31-Jan-01	14:39:28	14.53	3.97
31-Jan-01	14:40:28	14.803	3.825
31-Jan-01	14:41:28	11.39	6.654
31-Jan-01	14:42:28	8.339	8.695
31-Jan-01	14:43:28	8.546	8.532

Malcolm Grow Medical Center - Andrews AFB, MD

Medical Waste Incinerator

CEM Responses

M23-1

Date	Time	O2	CO2
31-Jan-01	14:44:28	9.154	8.18
31-Jan-01	14:45:28	10.339	7.289
31-Jan-01	14:46:28	11.113	6.65
31-Jan-01	14:47:28	11.122	6.624
31-Jan-01	14:48:28	11.325	6.423
31-Jan-01	14:49:28	11.308	6.383
Average	M23-1	11.7	6.1

Malcolm Grow Medical Center - Andrews AFB, MD
Medical Waste Incinerator
CEM Responses

M23-2

Date	Time	O2	CO2	
31-Jan-01	16:10:42	13.981	4.38	
31-Jan-01	16:11:42	14.323	4.125	
31-Jan-01	16:12:42	14.511	3.97	
31-Jan-01	16:13:42	14.717	3.81	
31-Jan-01	16:14:42	15.139	3.565	
31-Jan-01	16:15:42	11.357	6.914	
31-Jan-01	16:16:42	8.068	8.967	
31-Jan-01	16:17:42	9.252	8.032	
31-Jan-01	16:18:42	10.875	6.827	
31-Jan-01	16:19:42	12.376	5.693	
31-Jan-01	16:20:42	12.874	5.242	
31-Jan-01	16:21:42	13.247	4.908	
31-Jan-01	16:22:42	13.504	4.713	
31-Jan-01	16:23:42	13.887	4.435	
31-Jan-01	16:24:42	14.188	4.208	
31-Jan-01	16:25:42	14.625	3.936	
31-Jan-01	16:26:42	10.514	7.581	
31-Jan-01	16:27:42	9.016	8.377	
31-Jan-01	16:28:42	9.451	7.862	
31-Jan-01	16:29:42	10.719	6.888	
31-Jan-01	16:30:42	11.758	6.1	
31-Jan-01	16:31:42	12.387	5.596	
31-Jan-01	16:32:42	12.623	5.362	
31-Jan-01	16:33:42	12.948	5.121	
31-Jan-01	16:34:42	13.485	4.691	
31-Jan-01	16:35:42	13.512	4.661	
31-Jan-01	16:36:42	13.858	4.409	
31-Jan-01	16:37:42			
31-Jan-01	16:38:42			
31-Jan-01	16:39:42			
31-Jan-01	16:40:42			Cal Check
31-Jan-01	16:41:42			
31-Jan-01	16:42:42			
31-Jan-01	16:43:42			
31-Jan-01	16:44:42			
31-Jan-01	16:45:42			
31-Jan-01	16:46:42	12.411	5.565	
31-Jan-01	16:47:42	12.782	5.275	
31-Jan-01	16:48:42	13.028	5.042	
31-Jan-01	16:49:42	13.404	4.776	
31-Jan-01	16:50:42	13.798	4.484	

Malcolm Grow Medical Center - Andrews AFB, MD
Medical Waste Incinerator
CEM Responses

M23-2

Date	Time	O2	CO2
31-Jan-01	16:51:42	14.074	4.255
31-Jan-01	16:52:42	14.391	4.062
31-Jan-01	16:53:42	9.81	8.222
31-Jan-01	16:54:42	9.805	7.702
31-Jan-01	16:55:42	9.801	7.648
31-Jan-01	16:56:42	10.562	7.084
31-Jan-01	16:57:42	11.329	6.505
31-Jan-01	16:58:42	11.938	6.049
31-Jan-01	16:59:42	12.236	5.793
31-Jan-01	17:00:42	12.407	5.653
31-Jan-01			
31-Jan-01	17:02:21	11.124	7.005
31-Jan-01	17:03:21	8.432	9.16
31-Jan-01	17:04:21	9.374	8.09
31-Jan-01	17:05:21	9.956	7.591
31-Jan-01	17:06:21	10.945	6.774
31-Jan-01	17:07:21	11.587	6.287
31-Jan-01	17:08:21	12.097	5.852
31-Jan-01	17:09:21	12.248	5.719
31-Jan-01	17:10:21	12.336	5.642
31-Jan-01	17:11:21	12.782	5.282
31-Jan-01	17:12:21	13.096	5.036
31-Jan-01	17:13:21	13.166	4.967
31-Jan-01	17:14:21	10.991	7.269
31-Jan-01	17:15:21	7.328	9.699
31-Jan-01	17:16:21	8.221	8.861
31-Jan-01	17:17:21	10.311	7.37
31-Jan-01	17:18:21	12.459	5.77
31-Jan-01	17:19:21	12.763	5.363
31-Jan-01	17:20:21	13.015	5.123
31-Jan-01	17:21:21	13.23	4.945
31-Jan-01	17:22:21	13.551	4.705
31-Jan-01	17:23:21	14.065	4.342
31-Jan-01	17:24:21	10.662	7.475
31-Jan-01	17:25:21	10.297	7.304
31-Jan-01	17:26:21	11.009	6.606
31-Jan-01	17:27:21	10.867	6.711
31-Jan-01	17:28:21	11.458	6.26
31-Jan-01	17:29:21	11.976	5.867
31-Jan-01	17:30:21	13.084	5.053
31-Jan-01	17:31:21	13.52	4.713

Malcolm Grow Medical Center - Andrews AFB, MD
Medical Waste Incinerator
CEM Responses

M23-2

Date	Time	O2	CO2
31-Jan-01	17:32:21	14.007	4.373
31-Jan-01	17:33:21	13.843	4.447
31-Jan-01	17:34:21	14.216	4.173
31-Jan-01	17:35:21	14.486	3.963
31-Jan-01	17:36:21	14.658	3.826
31-Jan-01	17:37:21	14.75	3.759
31-Jan-01	17:38:21	14.852	3.67
31-Jan-01	17:39:21	14.928	3.613
31-Jan-01	17:40:21	14.975	3.585
31-Jan-01	17:41:21	14.94	3.617
31-Jan-01	17:42:21	12.031	6.471
31-Jan-01	17:43:21	8.693	8.513
31-Jan-01	17:44:21	9.304	7.907
31-Jan-01	17:45:21	11.288	6.432
31-Jan-01	17:46:21	12.6	5.468
31-Jan-01	17:47:21	13.098	5.039
31-Jan-01	17:48:21	13.464	4.744
31-Jan-01	17:49:21	13.682	4.542
31-Jan-01	17:50:21	14.071	4.275
31-Jan-01	17:51:21	14.689	3.862
31-Jan-01	17:52:21	9.804	8.31
31-Jan-01	17:53:21	10.491	7.174
31-Jan-01	17:54:21	11.466	6.392
31-Jan-01	17:55:21	11.768	6.168
31-Jan-01	17:56:21	12.659	5.469
31-Jan-01	17:57:21	12.742	5.345
31-Jan-01	17:58:21	13.144	5.038
31-Jan-01	17:59:21	13.244	4.925
31-Jan-01	18:00:21	13.456	4.748
31-Jan-01	18:01:21	13.84	4.471
31-Jan-01	18:02:21	14.093	4.292
31-Jan-01	18:03:21	14.473	4.045
31-Jan-01	18:04:21	10.853	7.466
31-Jan-01	18:05:21	10.612	7.12
31-Jan-01	18:06:21	11.108	6.613
31-Jan-01	18:07:21	11.366	6.408
31-Jan-01	18:08:21	12.341	5.642
31-Jan-01	18:09:21	12.864	5.208
31-Jan-01	18:10:21	12.804	5.187
31-Jan-01	18:11:21	13.256	4.841
31-Jan-01	18:12:21	13.732	4.505

Malcolm Grow Medical Center - Andrews AFB, MD
Medical Waste Incinerator
CEM Responses

M23-2

Date	Time	O2	CO2
31-Jan-01	18:13:21	14.112	4.237
31-Jan-01	18:14:21	11.466	6.834
31-Jan-01	18:15:21	7.967	9.059
31-Jan-01	18:16:21	8.954	8.206
31-Jan-01	18:17:21	10.433	7.106
31-Jan-01	18:18:21	11.703	6.15
31-Jan-01	18:19:21	12.274	5.681
31-Jan-01	18:20:21	12.514	5.458
31-Jan-01	18:21:21	12.944	5.144
31-Jan-01	18:22:21	13.316	4.857
31-Jan-01	18:23:21	13.795	4.496
31-Jan-01	18:24:21	13.879	4.411
31-Jan-01	18:25:21	11.887	6.416
31-Jan-01	18:26:21	8.705	8.851
31-Jan-01	18:27:21	9.937	7.551
31-Jan-01	18:28:21	10.581	6.997
31-Jan-01	18:29:21	11.57	6.21
31-Jan-01	18:30:21	12.434	5.607
31-Jan-01	18:31:21	12.947	5.195
31-Jan-01	18:32:21	13.364	4.846
31-Jan-01	18:33:21	13.671	4.581
31-Jan-01	18:34:21	14.1	4.265
31-Jan-01	18:35:21	14.164	4.193
31-Jan-01	18:36:21	14.485	3.965
31-Jan-01	18:37:21	14.694	3.797
31-Jan-01	18:38:21	14.84	3.693
31-Jan-01	18:39:21	14.978	3.636
31-Jan-01	18:40:21	9.458	8.634
31-Jan-01	18:41:21	9.4	8.097
31-Jan-01	18:42:21	9.748	7.732
31-Jan-01	18:43:21	10.776	6.868
31-Jan-01	18:44:21	11.989	5.951
31-Jan-01	18:45:21	12.714	5.406
31-Jan-01	18:46:21	13.014	5.148
31-Jan-01	18:47:21	13.229	4.964
31-Jan-01	18:48:21	13.152	4.989
31-Jan-01	18:49:21	12.136	6.112
31-Jan-01	18:50:21	7.219	10.038
31-Jan-01	18:51:21	7.664	9.392
31-Jan-01	18:52:21	9.429	8.28
31-Jan-01	18:53:21	11.403	6.834

Malcolm Grow Medical Center - Andrews AFB, MD
Medical Waste Incinerator
CEM Responses

M23-2

Date	Time	O2	CO2
31-Jan-01	18:54:21	11.882	6.371
31-Jan-01	18:55:21	11.692	6.383
31-Jan-01	18:56:21	11.826	6.239
31-Jan-01	18:57:21	12.156	5.929
31-Jan-01	18:58:21	12.321	5.787
31-Jan-01	18:59:21	12.45	5.666
31-Jan-01	19:00:21	12.816	5.37
31-Jan-01	19:01:21	13.087	5.209
31-Jan-01	19:02:21	8.274	9.598
31-Jan-01	19:03:21	9.977	7.787
31-Jan-01	19:04:21	11.253	6.646
31-Jan-01	19:05:21	11.716	6.28
31-Jan-01	19:06:21	12.394	5.753
31-Jan-01	19:07:21	12.829	5.391
31-Jan-01	19:08:21	13.214	5.079
31-Jan-01	19:09:21	13.553	4.805
31-Jan-01	19:10:21	13.663	4.695
31-Jan-01	19:11:21	13.823	4.565
31-Jan-01	19:12:21	14.309	4.224
31-Jan-01	19:13:21	10.581	7.677
31-Jan-01	19:14:21	9.505	8.089
31-Jan-01	19:15:21	10.174	7.499
31-Jan-01	19:16:21	10.977	6.83
31-Jan-01	19:17:21	11.736	6.203
31-Jan-01	19:18:21	12.291	5.763
31-Jan-01	19:19:21	12.589	5.501
31-Jan-01	19:20:21	13.08	5.102
31-Jan-01	19:21:21	13.241	4.949
31-Jan-01	19:22:21	13.502	4.761
31-Jan-01	19:23:21	13.908	4.452
31-Jan-01	19:24:21	11.564	6.722
31-Jan-01	19:25:21	8.584	8.748
31-Jan-01	19:26:21	9.973	7.439
31-Jan-01	19:27:21	11.184	6.522
31-Jan-01			
31-Jan-01	19:29:31	13.399	4.836
31-Jan-01	19:30:31	13.686	4.603
31-Jan-01	19:31:31	14.023	4.335
31-Jan-01	19:32:31	14.344	4.098
31-Jan-01	19:33:31	14.811	3.774
31-Jan-01	19:34:31	9.996	8.011

Malcolm Grow Medical Center - Andrews AFB, MD
Medical Waste Incinerator
CEM Responses

M23-2

Date	Time	O2	CO2
31-Jan-01	19:35:31	8.861	8.328
31-Jan-01	19:36:31	10.395	7.09
31-Jan-01	19:37:31	11.673	6.136
31-Jan-01	19:38:31	12.531	5.494
31-Jan-01	19:39:31	13.025	5.123
31-Jan-01	19:40:31	13.637	4.646
31-Jan-01	19:41:31	14.154	4.229
31-Jan-01	19:42:31	14.488	3.958
31-Jan-01	19:43:31	14.681	3.827
31-Jan-01	19:44:31	14.482	3.929
31-Jan-01	19:45:31	14.65	3.818
31-Jan-01	19:46:31	14.763	3.725
31-Jan-01	19:47:31	13.48	5.136
31-Jan-01	19:48:31	10.616	7.368
31-Jan-01	19:49:31	9.963	7.554
31-Jan-01	19:50:31	9.083	8.168
31-Jan-01	19:51:31	10.554	7.018
31-Jan-01	19:52:31	11.621	6.196
31-Jan-01	19:53:31	12.34	5.642
31-Jan-01	19:54:31	12.604	5.438
31-Jan-01	19:55:31	12.937	5.156
31-Jan-01	19:56:31	13.312	4.863
31-Jan-01	19:57:31	11.965	6.191
31-Jan-01	19:58:31	9.017	8.68
31-Jan-01	19:59:31	10.349	7.241
31-Jan-01	20:00:31	10.987	6.671
31-Jan-01	20:01:31	11.524	6.265
31-Jan-01	20:02:31	11.797	6.051
31-Jan-01	20:03:31	12.178	5.749
31-Jan-01	20:04:31	12.3	5.646
31-Jan-01	20:05:31	12.499	5.474
31-Jan-01	20:06:31	12.466	5.508
31-Jan-01	20:07:31	9.349	8.619
31-Jan-01	20:08:31	10.128	7.439
31-Jan-01	20:09:31	10.879	6.711
31-Jan-01	20:10:31	11.749	6.062
31-Jan-01	20:11:31	12.654	5.395
31-Jan-01	20:12:31	13.087	5.03
31-Jan-01	20:13:31	13.271	4.88
31-Jan-01	20:14:31	13.468	4.719
31-Jan-01	20:15:31	13.586	4.615

Malcolm Grow Medical Center - Andrews AFB, MD
Medical Waste Incinerator
CEM Responses

M23-2

Date	Time	O2	CO2	
31-Jan-01	20:16:31	11.945	6.43	
31-Jan-01	20:17:31	9.95	7.911	
31-Jan-01	20:18:31	10.619	7.092	
31-Jan-01	20:19:31	10.632	7.096	
31-Jan-01	20:20:31	11.807	6.171	
31-Jan-01	20:21:31	12.609	5.507	
31-Jan-01	20:22:31	12.945	5.209	
31-Jan-01	20:23:31	13.196	5.008	
31-Jan-01	20:24:31	13.467	4.789	
31-Jan-01	20:25:31	13.365	4.856	
31-Jan-01	20:26:31	14.008	4.406	
31-Jan-01	20:27:31	10.33	7.846	
31-Jan-01	20:28:31	10.006	7.474	
31-Jan-01	20:29:31	11.794	7.05	
31-Jan-01	20:30:31			
31-Jan-01	20:31:31			
31-Jan-01	20:32:31			
31-Jan-01	20:34:00			
31-Jan-01	20:35:00			Cal Check
31-Jan-01	20:36:00			
31-Jan-01	20:37:00			
31-Jan-01	20:38:00			
31-Jan-01	20:39:00			
31-Jan-01	20:40:00			
Average	M23-2	12.2	5.9	

Malcolm Grow Medical Center - Andrews AFB, MD
Medical Waste Incinerator
CEM Responses

M23-3

Date	Time	O2	CO2
2/ 1/101	9:10:00	12.832	5.33
2/ 1/101	9:11:00	13.373	4.869
2/ 1/101	9:12:00	13.966	4.419
2/ 1/101	9:13:00	14.29	4.17
2/ 1/101	9:14:00	14.513	3.989
2/ 1/101	9:15:00	13.408	4.554
2/ 1/101	9:16:00	13.451	4.574
2/ 1/101	9:17:00	10.678	7.566
2/ 1/101	9:18:00	9.866	7.777
2/ 1/101	9:19:00	9.84	7.612
2/ 1/101	9:20:00	10.2	7.443
2/ 1/101	9:21:00	12.279	5.749
2/ 1/101	9:22:00	12.997	5.158
2/ 1/101	9:23:00	13.609	4.676
2/ 1/101	9:24:00	13.882	4.425
2/ 1/101	9:25:00	13.991	4.314
2/ 1/101	9:26:00	14.214	4.142
2/ 1/101	9:27:00	14.517	3.902
2/ 1/101	9:28:00	13.94	4.221
2/ 1/101	9:29:00	13.846	4.275
2/ 1/101	9:30:00	14.453	3.941
2/ 1/101	9:31:00	10.26	7.872
2/ 1/101	9:32:00	9.142	8.036
2/ 1/101	9:33:00	8.592	8.282
2/ 1/101	9:34:00	10.308	7.231
2/ 1/101	9:35:00	12.22	5.866
2/ 1/101	9:36:00	12.845	5.333
2/ 1/101	9:37:00	13.379	4.882
2/ 1/101	9:38:00	13.968	4.387
2/ 1/101	9:39:00	14.439	4.032
2/ 1/101	9:40:00	14.248	4.416
2/ 1/101	9:41:00	10.234	7.878
2/ 1/101	9:42:00	11.043	6.824
2/ 1/101	9:43:00	9.472	7.999
2/ 1/101	9:44:00	10.376	7.322
2/ 1/101	9:45:00	11.534	6.376
2/ 1/101	9:46:00	12.437	5.668
2/ 1/101	9:47:00	13.16	5.079
2/ 1/101	9:48:00	13.625	4.721
2/ 1/101	9:49:00	14.316	4.246
2/ 1/101	9:50:00	10.638	7.819

Malcolm Grow Medical Center - Andrews AFB, MD
Medical Waste Incinerator
CEM Responses

M23-3

Date	Time	O2	CO2		
2/ 1/101	9:51:00	10.535	7.33		
2/ 1/101	9:52:00	8.936	8.458		
2/ 1/101	9:53:00	8.673	8.738		
2/ 1/101	9:54:00	10.017	7.619		
2/ 1/101	9:55:00	10.574	7.152		
2/ 1/101	9:56:00	10.951	6.871		
2/ 1/101	9:57:00	11.449	6.484		
2/ 1/101	9:58:00	11.642	6.299		
2/ 1/101	9:59:00	12.154	5.916		
2/ 1/101	10:00:00	12.566	5.554		
2/ 1/101	10:01:00	10.903	7.365		
2/ 1/101	10:02:00	8.964	8.744		
2/ 1/101	10:03:00	9.559	8.092		
2/ 1/101	10:04:00	9.668	7.908		
2/ 1/101	10:05:00	10.545	7.141		
2/ 1/101	10:06:00	11.244	6.566		
2/ 1/101	10:07:00	11.936	6.043		
2/ 1/101	10:08:00	12.305	5.788		
2/ 1/101	10:09:00	12.52	5.593		
2/ 1/101	10:10:00	12.909	5.275	M26-3 Average	11.9
2/ 1/101	10:11:00	13.475	4.902		
2/ 1/101	10:12:00	9.177	8.761		
2/ 1/101	10:13:00	8.577	8.649		
2/ 1/101	10:14:00	9.085	8.282		
2/ 1/101	10:15:00	10.279	7.375		
2/ 1/101	10:16:00			Cal Check	
2/ 1/101	10:17:00				
2/ 1/101	10:18:00				
2/ 1/101	10:19:00				
2/ 1/101	10:20:00				
2/ 1/101	10:21:00				
2/ 1/101	10:22:00				
2/ 1/101	10:23:00				
2/ 1/101	10:24:00				
2/ 1/101	10:25:00				
2/ 1/101	10:26:00				
2/ 1/101	10:27:00				
2/ 1/101	10:28:00				
2/ 1/101	10:29:00				
2/ 1/101	10:30:00				
2/ 1/101	10:31:00				

Malcolm Grow Medical Center - Andrews AFB, MD
Medical Waste Incinerator
CEM Responses

M23-3

Date	Time	O2	CO2
2/ 1/101	10:32:00		
2/ 1/101	10:33:00		
2/ 1/101	10:34:00		
2/ 1/101	10:35:00		
2/ 1/101	10:36:00		
2/ 1/101	10:37:00	12.878	10.19
2/ 1/101	10:38:00	15.437	8.115
2/ 1/101	10:39:00	11.785	6.203
2/ 1/101	10:40:00	12.042	6.019
2/ 1/101	10:41:00	12.564	5.612
2/ 1/101	10:42:00	12.63	5.56
2/ 1/101	10:43:00	13.289	5.076
2/ 1/101	10:44:00	10.305	7.95
2/ 1/101	10:45:00	8.945	8.683
2/ 1/101	10:46:00	9.727	7.897
2/ 1/101	10:47:00	10.6	7.177
2/ 1/101	10:48:00	11.646	6.379
2/ 1/101	10:49:00	12.215	5.94
2/ 1/101	10:50:00	12.597	5.642
2/ 1/101	10:51:00	12.665	5.577
2/ 1/101	10:52:00	12.924	5.355
2/ 1/101	10:53:00	13.463	4.988
2/ 1/101	10:54:00	9.969	8.326
2/ 1/101	10:55:00	9.096	8.671
2/ 1/101	10:56:00	10.469	7.507
2/ 1/101	10:57:00	11.319	6.751
2/ 1/101	10:58:00	12.158	6.073
2/ 1/101	10:59:00	12.506	5.768
2/ 1/101	11:00:00	12.869	5.43
2/ 1/101	11:01:00	13.481	4.946
2/ 1/101	11:02:00	13.759	4.688
2/ 1/101	11:03:00	13.836	4.641
2/ 1/101	11:04:00	10.62	7.743
2/ 1/101	11:05:00	6.191	10.729
2/ 1/101	11:06:00	10.01	7.683
2/ 1/101	11:07:00	11.518	6.523
2/ 1/101	11:08:00	12.299	5.897
2/ 1/101	11:09:00	12.537	5.683
2/ 1/101	11:10:00	12.884	5.396
2/ 1/101	11:11:00	13.218	5.137
2/ 1/101	11:12:00	13.494	4.911

Malcolm Grow Medical Center - Andrews AFB, MD
Medical Waste Incinerator
CEM Responses

M23-3

Date	Time	O2	CO2	
2/ 1/101	11:13:00	13.805	4.689	
2/ 1/101	11:14:00	14.098	4.486	
2/ 1/101	11:15:00	13.186	5.444	
2/ 1/101	11:16:00	9.176	8.904	
2/ 1/101	11:17:00	11.267	6.771	
2/ 1/101	11:18:00	11.588	6.419	
2/ 1/101	11:19:00	12.523	5.703	
2/ 1/101	11:20:00	12.933	5.366	
2/ 1/101	11:21:00	13.341	5.052	
2/ 1/101	11:22:00	13.693	4.788	
2/ 1/101	11:23:00	13.854	4.649	
2/ 1/101	11:24:00	14.074	4.477	
2/ 1/101	11:25:00	14.241	4.344	
2/ 1/101	11:26:00	14.573	4.173	
2/ 1/101	11:27:00	9.687	8.461	
2/ 1/101	11:28:00	8.1	9.214	
2/ 1/101	11:29:00	9.455	8.134	
2/ 1/101	11:30:00	10.169	7.642	
2/ 1/101	11:31:00	11.088	6.935	
2/ 1/101	11:32:00	11.505	6.614	
2/ 1/101	11:33:00	11.613	6.505	
2/ 1/101	11:34:00	11.614	6.492	
2/ 1/101	11:35:00	11.974	6.215	
2/ 1/101	11:36:00	12.005	6.178	
2/ 1/101	11:37:00	12.393	5.877	
2/ 1/101	11:38:00	12.308	5.9	
2/ 1/101	11:39:00	12.506	5.751	
2/ 1/101	11:40:00	12.946	5.407	
2/ 1/101	11:41:00	13.334	5.102	
2/ 1/101	11:42:00	13.596	4.895	
2/ 1/101	11:43:00			Cal check
2/ 1/101	11:44:00			
2/ 1/101	11:45:00			
2/ 1/101	11:46:00			
2/ 1/101	11:47:00			
2/ 1/101	11:48:00			
2/ 1/101	11:49:00			
2/ 1/101	11:50:00			
2/ 1/101	11:51:00			
2/ 1/101	11:52:00			
2/ 1/101	11:53:00			

Malcolm Grow Medical Center - Andrews AFB, MD
Medical Waste Incinerator
CEM Responses

M23-3

Date	Time	O2	CO2
2/ 1/101	11:54:00		
2/ 1/101	11:55:00		
2/ 1/101	11:56:00		
2/ 1/101	11:57:00		
2/ 1/101	11:58:00		
2/ 1/101	11:59:00		
2/ 1/101	12:00:00	12.137	9.942
2/ 1/101	12:01:00	12.143	9.954
2/ 1/101	12:02:00	12.146	9.963
2/ 1/101	12:03:00	12.15	9.978
2/ 1/101	12:04:00	12.154	9.983
2/ 1/101	12:05:00	12.159	9.989
2/ 1/101	12:06:00	12.16	10.002
2/ 1/101	12:07:00	11.257	8.915
2/ 1/101	12:08:00	10.168	7.656
2/ 1/101	12:09:00	10.95	7.008
2/ 1/101	12:10:00	11.835	6.326
2/ 1/101	12:11:00	12.539	5.76
2/ 1/101	12:12:00	12.933	5.435
2/ 1/101	12:13:00	13.227	5.167
2/ 1/101	12:14:00	13.667	4.81
2/ 1/101	12:15:00	13.788	4.706
2/ 1/101	12:16:00	14.031	4.536
2/ 1/101	12:17:00	11.588	7.121
2/ 1/101	12:18:00	10.083	7.839
2/ 1/101	12:19:29	11.206	6.727
2/ 1/101	12:20:29	12.101	6.049
2/ 1/101	12:21:29	13.215	5.192
2/ 1/101	12:22:29	13.592	4.891
2/ 1/101	12:23:29	14.004	4.546
2/ 1/101	12:24:29	14.23	4.381
2/ 1/101	12:25:29	14.516	4.178
2/ 1/101	12:26:29	14.943	3.923
2/ 1/101	12:27:29	10.235	8.31
2/ 1/101	12:28:29	11.381	6.825
2/ 1/101	12:29:29	11.542	6.538
2/ 1/101	12:30:29	11.738	6.358
2/ 1/101	12:31:29	12.576	5.688
2/ 1/101	12:32:29	13.078	5.288
2/ 1/101	12:33:29	13.652	4.834

Malcolm Grow Medical Center - Andrews AFB, MD
Medical Waste Incinerator
CEM Responses

M23-3

Date	Time	O2	CO2
2/ 1/101	12:34:29	13.947	4.603
2/ 1/101	12:35:29	14.347	4.323
2/ 1/101	12:36:29	14.64	4.091
2/ 1/101	12:37:29	14.511	4.325
2/ 1/101	12:38:29	9.614	8.613
2/ 1/101	12:39:29	9.201	8.442
2/ 1/101	12:40:29	9.453	8.197
2/ 1/101	12:41:29	10.643	7.267
2/ 1/101	12:42:29	11.428	6.624
2/ 1/101	12:43:29	11.791	6.321
2/ 1/101	12:44:29	12.191	6.02
2/ 1/101	12:45:29	12.961	5.435
2/ 1/101	12:46:29	13.6	4.94
2/ 1/101	12:47:29	13.781	4.746
2/ 1/101	12:48:29	14.249	4.423
2/ 1/101	12:49:29	14.535	4.212
2/ 1/101	12:50:29	14.724	4.071
2/ 1/101	12:51:29	14.934	3.898
2/ 1/101	12:52:29	14.969	3.842
2/ 1/101	12:53:29	14.979	3.871
2/ 1/101	12:54:29	12.102	6.74
2/ 1/101	12:55:29	7.532	9.453
2/ 1/101	12:56:29	6.595	10.288
2/ 1/101	12:57:29	9.149	8.485
2/ 1/101	12:58:29	11.267	6.889
2/ 1/101	12:59:29	11.513	6.646
2/ 1/101	13:00:29	11.824	6.325
2/ 1/101	13:01:29	11.852	6.281
2/ 1/101	13:02:29	12.271	5.962
2/ 1/101	13:03:29	12.545	5.801
2/ 1/101	13:04:29	7.915	9.943
2/ 1/101	13:05:29	7.933	9.476
2/ 1/101	13:06:29	10.095	7.887
2/ 1/101	13:07:29	11.466	6.831
2/ 1/101	13:08:29	12.128	6.236
2/ 1/101	13:09:29	12.243	6.052
2/ 1/101	13:10:29	12.46	5.851
2/ 1/101	13:11:29	12.75	5.625
2/ 1/101	13:12:29	13.198	5.272
2/ 1/101	13:13:29	13.126	5.316
2/ 1/101	13:14:29	13.437	5.067

Malcolm Grow Medical Center - Andrews AFB, MD
Medical Waste Incinerator
CEM Responses

M23-3

Date	Time	O2	CO2
2/ 1/101	13:15:29	13.82	4.778
2/ 1/101	13:16:29	14.073	4.581
2/ 1/101	13:17:29	14.328	4.386
2/ 1/101	13:18:29	14.566	4.204
2/ 1/101	13:19:29	14.35	4.334
2/ 1/101	13:20:29	14.645	4.135
2/ 1/101	13:21:29	14.811	3.993
2/ 1/101	13:22:29	14.913	3.933
2/ 1/101	13:23:29	15.023	3.85
2/ 1/101	13:24:29	15.111	3.781
2/ 1/101	13:25:29	15.172	3.739
2/ 1/101	13:26:29	15.246	3.676
2/ 1/101	13:27:29	15.318	3.633
2/ 1/101	13:28:29	15.34	3.603
2/ 1/101	13:29:29	14.024	4.357
2/ 1/101	13:30:29	13.709	4.563
Average	M23-3	12.2	6.2

Malcolm Grow Medical Center - Andrews AFB, MD

Medical Waste Incinerator

CEM Responses

M26-1

Date	Time	O2	CO2
31-Jan-01	10:45	12.0	5.6
31-Jan-01	10:46	12.5	5.6
31-Jan-01	10:47	12.5	4.8
31-Jan-01	10:48	13.0	4.8
31-Jan-01	10:49	13.3	4.0
31-Jan-01	10:50	13.5	8.8
31-Jan-01	10:51	9.3	8.0
31-Jan-01	10:52	9.5	8.0
31-Jan-01	10:53	10.0	7.2
31-Jan-01	10:54	11.3	5.2
31-Jan-01	10:55	12.8	4.8
31-Jan-01	10:56	13.0	4.8
31-Jan-01	10:57	8.8	8.0
31-Jan-01	10:58	9.8	8.4
31-Jan-01	10:59	10.8	8.8
31-Jan-01	11:00	10.8	8.8
31-Jan-01	11:01	12.0	8.4
31-Jan-01	11:02	12.8	8.0
31-Jan-01	11:03	13.3	8.0
31-Jan-01	11:04	13.5	7.2
31-Jan-01	11:05	13.8	6.8
31-Jan-01	11:06	14.0	6.4
31-Jan-01	11:07	14.0	6.0
31-Jan-01	11:08	15.0	5.6
31-Jan-01	11:09	10.3	5.2
31-Jan-01	11:10	11.0	4.8
31-Jan-01	11:11	9.3	5.2
31-Jan-01	11:12	11.8	5.6
31-Jan-01	11:13:15	10.055	5.659
31-Jan-01	11:14:15	10.784	5.529
31-Jan-01	11:15:15	10.336	5.245
31-Jan-01	11:16:15	10.981	5.02
31-Jan-01	11:17:15	12.067	4.993
31-Jan-01	11:18:15	12.374	5.198
31-Jan-01	11:19:15	12.5	5.507
31-Jan-01	11:20:15	12.865	5.801
31-Jan-01	11:21:15	13.414	6.02
31-Jan-01	11:22:15	13.929	6.115
31-Jan-01	11:23:15	9.623	6.085
31-Jan-01	11:24:15	8.689	6.001
31-Jan-01	11:25:15	10.295	5.856

Malcolm Grow Medical Center - Andrews AFB, MD

Medical Waste Incinerator

CEM Responses

M26-1

Date	Time	O2	CO2
31-Jan-01	11:26:15	9.827	5.673
31-Jan-01	11:27:15	10.649	5.545
31-Jan-01	11:28:15	11.78	5.621
31-Jan-01	11:29:00	11	6
31-Jan-01	11:30:00	11.75	6
31-Jan-01	11:31:00	12.25	6.4
31-Jan-01	11:32:00	12.5	6.4
31-Jan-01	11:33:00	13	6.4
31-Jan-01	11:34:00	13.75	6.4
31-Jan-01	11:35:00	13.5	6.4
31-Jan-01	11:36:00	9.25	6.4
31-Jan-01	11:37:00	10	6.4
31-Jan-01	11:38:00	9.5	6
31-Jan-01	11:39:00	10.5	6.4
31-Jan-01	11:40:00	12	6.4
31-Jan-01	11:41:45	13.415	6.409
31-Jan-01	11:42:45	13.613	6.541
31-Jan-01	11:43:45	10.964	6.566
31-Jan-01	11:44:45	9.35	6.505
Average(		11.7	6.2

Malcolm Grow Medical Center - Andrews AFB, MD

Medical Waste Incinerator

CEM Responses

M26-3

Date	Time	O2	CO2
2/ 1/101	9:10:00	12.832	5.33
2/ 1/101	9:11:00	13.373	4.869
2/ 1/101	9:12:00	13.966	4.419
2/ 1/101	9:13:00	14.29	4.17
2/ 1/101	9:14:00	14.513	3.989
2/ 1/101	9:15:00	13.408	4.554
2/ 1/101	9:16:00	13.451	4.574
2/ 1/101	9:17:00	10.678	7.566
2/ 1/101	9:18:00	9.866	7.777
2/ 1/101	9:19:00	9.84	7.612
2/ 1/101	9:20:00	10.2	7.443
2/ 1/101	9:21:00	12.279	5.749
2/ 1/101	9:22:00	12.997	5.158
2/ 1/101	9:23:00	13.609	4.676
2/ 1/101	9:24:00	13.882	4.425
2/ 1/101	9:25:00	13.991	4.314
2/ 1/101	9:26:00	14.214	4.142
2/ 1/101	9:27:00	14.517	3.902
2/ 1/101	9:28:00	13.94	4.221
2/ 1/101	9:29:00	13.846	4.275
2/ 1/101	9:30:00	14.453	3.941
2/ 1/101	9:31:00	10.26	7.872
2/ 1/101	9:32:00	9.142	8.036
2/ 1/101	9:33:00	8.592	8.282
2/ 1/101	9:34:00	10.308	7.231
2/ 1/101	9:35:00	12.22	5.866
2/ 1/101	9:36:00	12.845	5.333
2/ 1/101	9:37:00	13.379	4.882
2/ 1/101	9:38:00	13.968	4.387
2/ 1/101	9:39:00	14.439	4.032
2/ 1/101	9:40:00	14.248	4.416
2/ 1/101	9:41:00	10.234	7.878
2/ 1/101	9:42:00	11.043	6.824
2/ 1/101	9:43:00	9.472	7.999
2/ 1/101	9:44:00	10.376	7.322
2/ 1/101	9:45:00	11.534	6.376
2/ 1/101	9:46:00	12.437	5.668
2/ 1/101	9:47:00	13.16	5.079
2/ 1/101	9:48:00	13.625	4.721
2/ 1/101	9:49:00	14.316	4.246

Malcolm Grow Medical Center - Andrews AFB, MD

Medical Waste Incinerator

CEM Responses

M26-3

Date	Time	O2	CO2
2/ 1/101	9:50:00	10.638	7.819
2/ 1/101	9:51:00	10.535	7.33
2/ 1/101	9:52:00	8.936	8.458
2/ 1/101	9:53:00	8.673	8.738
2/ 1/101	9:54:00	10.017	7.619
2/ 1/101	9:55:00	10.574	7.152
2/ 1/101	9:56:00	10.951	6.871
2/ 1/101	9:57:00	11.449	6.484
2/ 1/101	9:58:00	11.642	6.299
2/ 1/101	9:59:00	12.154	5.916
2/ 1/101	10:00:00	12.566	5.554
2/ 1/101	10:01:00	10.903	7.365
2/ 1/101	10:02:00	8.964	8.744
2/ 1/101	10:03:00	9.559	8.092
2/ 1/101	10:04:00	9.668	7.908
2/ 1/101	10:05:00	10.545	7.141
2/ 1/101	10:06:00	11.244	6.566
2/ 1/101	10:07:00	11.936	6.043
2/ 1/101	10:08:00	12.305	5.788
2/ 1/101	10:09:00	12.52	5.593
Average		11.93	6.08

Malcolm Grow Medical Center - Andrews AFB, MD

Medical Waste Incinerator

CEM Responses

M26-4

Date	Time	O2	CO2
2-Feb-01	9:45:00	13.314	5.328
2-Feb-01	9:46:00	10.023	7.636
2-Feb-01	9:47:00	9.985	7.295
2-Feb-01	9:48:00	7.953	9.017
2-Feb-01	9:49:00	11.025	6.729
2-Feb-01	9:50:00	12.542	5.567
2-Feb-01	9:51:00	13.149	5.055
2-Feb-01	9:52:00	13.659	4.666
2-Feb-01	9:53:00	13.887	4.462
2-Feb-01	9:54:00	14.0	4.8
2-Feb-01	9:55:00	14.3	4.8
2-Feb-01	9:56:00	14.4	4.4
2-Feb-01	9:57:00	13.8	7.6
2-Feb-01	9:58:00	13.8	9.6
2-Feb-01	9:59:00	10.0	8.0
2-Feb-01	10:00:00	10.0	6.4
2-Feb-01	10:01:00	10.3	5.2
2-Feb-01	10:02:00	10.5	4.8
2-Feb-01	10:03:00	12.0	4.4
2-Feb-01	10:04:00	12.8	6.0
2-Feb-01	10:05:00	13.5	10.4
2-Feb-01	10:06:00	14.0	8.4
2-Feb-01	10:07:00	13.8	6.4
2-Feb-01	10:08:00	6.5	6.4
2-Feb-01	10:09:00	10.8	6.0
2-Feb-01	10:10:00	11.8	5.6
2-Feb-01	10:11:00	12.0	5.2
2-Feb-01	10:12:00	12.0	8.0
2-Feb-01	10:13:00	12.3	8.0
2-Feb-01	10:14:00	13.0	7.6
2-Feb-01	10:15:00	13.5	8.4
2-Feb-01	10:16:00	13.3	6.8
2-Feb-01	10:17:00	10.0	6.8
2-Feb-01	10:18:00	10.3	6.4
2-Feb-01	10:19:00	8.3	6.4
2-Feb-01	10:20:00	10.8	6.0
2-Feb-01	10:21:00	11.0	6.0
2-Feb-01	10:22:00	11.5	5.6
2-Feb-01	10:23:00	11.5	4.8
2-Feb-01	10:24:00	12.0	9.2

Malcolm Grow Medical Center - Andrews AFB, MD

Medical Waste Incinerator

CEM Responses

M26-4

Date	Time	O2	CO2
2-Feb-01	10:25:00	12.3	7.2
2-Feb-01	10:26:00	12.5	8.0
2-Feb-01	10:27:00	8.3	7.2
2-Feb-01	10:28:00	9.8	5.2
2-Feb-01	10:29:00	9.5	4.8
2-Feb-01	10:30:00	10.3	8.8
2-Feb-01	10:31:00	11.0	9.6
2-Feb-01	10:32:00	12.5	8.8
2-Feb-01	10:33:00	8.5	8.0
2-Feb-01	10:34:00	6.8	6.8
2-Feb-01	10:35:00	9.0	6.0
2-Feb-01	10:36:00	10.0	5.6
2-Feb-01	10:37:00	11.0	5.2
2-Feb-01	10:38:50	9.142	8.334
2-Feb-01	10:39:50	10.356	7.383
2-Feb-01	10:40:50	11.154	6.732
2-Feb-01	10:41:50	11.859	6.201
2-Feb-01	10:42:50	12.379	5.83
2-Feb-01	10:43:50	12.548	5.689
2-Feb-01	10:44:50	12.721	5.542
2-Feb-01	10:45:50	12.999	5.308
2-Feb-01	10:46:50	13.341	5.033
2-Feb-01	10:47:50	13.797	4.686
2-Feb-01	10:48:50	13.441	5.162
2-Feb-01	10:49:50	9.002	8.805
2-Feb-01	10:50:50	7.876	9.207
Averge		11.43	6.59

Malcolm Grow Medical Center - Andrews AFB, MD

Medical Waste Incinerator

CEM Responses

M29-1

Date	Time	O2	CO2
2-Feb-01	9:45:00	13.314	5.328
2-Feb-01	9:46:00	10.023	7.636
2-Feb-01	9:47:00	9.985	7.295
2-Feb-01	9:48:00	7.953	9.017
2-Feb-01	9:49:00	11.025	6.729
2-Feb-01	9:50:00	12.542	5.567
2-Feb-01	9:51:00	13.149	5.055
2-Feb-01	9:52:00	13.659	4.666
2-Feb-01	9:53:00	13.887	4.462
2-Feb-01	9:54:00	14.0	4.8
2-Feb-01	9:55:00	14.3	4.8
2-Feb-01	9:56:00	14.4	4.4
2-Feb-01	9:57:00	13.8	7.6
2-Feb-01	9:58:00	13.8	9.6
2-Feb-01	9:59:00	10.0	8.0
2-Feb-01	10:00:00	10.0	6.4
2-Feb-01	10:01:00	10.3	5.2
2-Feb-01	10:02:00	10.5	4.8
2-Feb-01	10:03:00	12.0	4.4
2-Feb-01	10:04:00	12.8	6.0
2-Feb-01	10:05:00	13.5	10.4
2-Feb-01	10:06:00	14.0	8.4
2-Feb-01	10:07:00	13.8	6.4
2-Feb-01	10:08:00	6.5	6.4
2-Feb-01	10:09:00	10.8	6.0
2-Feb-01	10:10:00	11.8	5.6
2-Feb-01	10:11:00	12.0	5.2
2-Feb-01	10:12:00	12.0	8.0
2-Feb-01	10:13:00	12.3	8.0
2-Feb-01	10:14:00	13.0	7.6
2-Feb-01	10:15:00	13.5	8.4
2-Feb-01	10:16:00	13.3	6.8
2-Feb-01	10:17:00	10.0	6.8
2-Feb-01	10:18:00	10.3	6.4
2-Feb-01	10:19:00	8.3	6.4
2-Feb-01	10:20:00	10.8	6.0
2-Feb-01	10:21:00	11.0	6.0
2-Feb-01	10:22:00	11.5	5.6
2-Feb-01	10:23:00	11.5	4.8
2-Feb-01	10:24:00	12.0	9.2

Malcolm Grow Medical Center - Andrews AFB, MD

Medical Waste Incinerator

CEM Responses

M29-1

Date	Time	O2	CO2
2-Feb-01	10:25:00	12.3	7.2
2-Feb-01	10:26:00	12.5	8.0
2-Feb-01	10:27:00	8.3	7.2
2-Feb-01	10:28:00	9.8	5.2
2-Feb-01	10:29:00	9.5	4.8
2-Feb-01	10:30:00	10.3	8.8
2-Feb-01	10:31:00	11.0	9.6
2-Feb-01	10:32:00	12.5	8.8
2-Feb-01	10:33:00	8.5	8.0
2-Feb-01	10:34:00	6.8	6.8
2-Feb-01	10:35:00	9.0	6.0
2-Feb-01	10:36:00	10.0	5.6
2-Feb-01	10:37:00	11.0	5.2
2-Feb-01	10:38:50	9.142	8.334
2-Feb-01	10:39:50	10.356	7.383
2-Feb-01	10:40:50	11.154	6.732
2-Feb-01	10:41:50	11.859	6.201
2-Feb-01	10:42:50	12.379	5.83
2-Feb-01	10:43:50	12.548	5.689
2-Feb-01	10:44:50	12.721	5.542
2-Feb-01	10:45:50	12.999	5.308
2-Feb-01	10:46:50	13.341	5.033
2-Feb-01	10:47:50	13.797	4.686
2-Feb-01	10:48:50	13.441	5.162
2-Feb-01	10:49:50	9.002	8.805
2-Feb-01	10:50:50	7.876	9.207
Average		11.4	6.6

Malcolm Grow Medical Center - Andrews AFB, MD

Medical Waste Incinerator

CEM Responses

M29-2

Date	Time	O2	CO2
2/ 2/101	13:10:40	12.234	10.311
2/ 2/101	13:11:40	12.206	10.314
2/ 2/101	13:12:40	12.756	10.317
2/ 2/101	13:13:40	14.074	10.309
2/ 2/101	13:14:40	13.328	9.972
2/ 2/101	13:15:40	10.234	7.67
2/ 2/101	13:16:40	11.05	7.004
2/ 2/101	13:17:40	11.536	6.625
2/ 2/101	13:18:40	11.618	6.53
2/ 2/101	13:19:40	11.92	6.294
2/ 2/101	13:20:40	12.272	5.982
2/ 2/101	13:21:40	12.518	5.758
2/ 2/101	13:22:40	12.732	5.584
2/ 2/101	13:23:40	13.156	5.244
2/ 2/101	13:24:40	13.666	4.887
2/ 2/101	13:25:40	9.666	8.662
2/ 2/101	13:26:40	9.954	7.847
2/ 2/101	13:27:40	10.525	7.298
2/ 2/101	13:28:40	10.578	7.215
2/ 2/101	13:29:40	10.941	6.885
2/ 2/101	13:30:40	11.39	6.555
2/ 2/101	13:31:40	11.845	6.212
2/ 2/101	13:32:40	12.062	6.027
2/ 2/101	13:33:40	12.517	5.692
2/ 2/101	13:34:40	12.331	5.808
2/ 2/101	13:35:40	12.425	5.735
Average		11.9	7.2

Malcolm Grow Medical Center - Andrews AFB, MD
Medical Waste Incinerator
CEM Responses

M29-3

Date	Time	O2	CO2
2/ 2/101	14:05:40	11.067	6.854
2/ 2/101	14:06:40	12.001	6.139
2/ 2/101	14:07:40	12.618	5.666
2/ 2/101	14:08:40	12.799	5.49
2/ 2/101	14:09:40	12.477	5.712
2/ 2/101	14:10:40	13.105	5.259
2/ 2/101	14:11:40	13.592	4.935
2/ 2/101	14:12:40	9.819	8.358
2/ 2/101	14:13:40	8.463	9.02
2/ 2/101	14:14:40	9.677	8.046
2/ 2/101	14:15:40	10.817	7.177
2/ 2/101	14:16:40	12.037	6.247
2/ 2/101	14:17:40	12.796	5.649
2/ 2/101	14:18:40	13.024	5.44
2/ 2/101	14:19:40	13.155	5.3
2/ 2/101	14:20:40	13.629	4.916
2/ 2/101	14:21:40	14.112	4.56
2/ 2/101	14:22:40	14.351	4.379
2/ 2/101	14:23:40	14.475	4.27
2/ 2/101	14:24:40	14.376	4.313
2/ 2/101	14:25:40	14.53	4.196
2/ 2/101	14:26:40	14.627	4.109
2/ 2/101	14:27:40	14.71	4.045
2/ 2/101	14:28:40	14.759	4.007
2/ 2/101	14:29:40	14.893	3.932
2/ 2/101	14:30:40	10.106	8.306
2/ 2/101	14:31:40	8.54	9.271
2/ 2/101	14:32:40	11.493	6.733
2/ 2/101	14:33:40	12.352	5.993
2/ 2/101	14:34:40	12.726	5.615
2/ 2/101	14:35:40	13.453	5.064
2/ 2/101	14:36:40	13.989	4.628
2/ 2/101	14:37:40	14.408	4.314
2/ 2/101	14:38:40	14.506	4.2
2/ 2/101	14:39:40	14.414	4.437
2/ 2/101	14:40:40	9.517	8.583
2/ 2/101	14:41:40	9.219	8.215
2/ 2/101	14:42:40	9.438	7.957
2/ 2/101	14:43:40	11.199	6.607
2/ 2/101	14:44:40	12.119	5.929

Malcolm Grow Medical Center - Andrews AFB, MD
Medical Waste Incinerator
CEM Responses

M29-3

Date	Time	O2	CO2
2/ 2/101	14:45:40	12.499	5.637
2/ 2/101	14:46:40	12.631	5.51
2/ 2/101	14:47:40	13.095	5.183
2/ 2/101	14:48:40	13.289	5.01
2/ 2/101	14:49:40	13.679	4.731
2/ 2/101	14:50:40	14.163	4.4
2/ 2/101	14:51:40	13.954	4.725
2/ 2/101	14:52:40	7.934	9.962
2/ 2/101	14:53:40	8.355	8.839
2/ 2/101	14:54:40	8.583	8.571
2/ 2/101	14:55:40	10.17	7.502
2/ 2/101	14:56:40	11.624	6.438
2/ 2/101	14:57:40	12.475	5.779
Average		12.3	6.0

Malcolm Grow Medical Center - Andrews AFB, MD

Medical Waste Incinerator

CEM Responses

Run 1

Date	Time	O2	CO2	NOx	CO	SO2
1-Feb-01	9:11:00	13.4	4.9	42.0	1.4	1.8
1-Feb-01	9:12:00	14.0	4.4	42.3	1.4	1.4
1-Feb-01	9:13:00	14.3	4.2	41.7	1.3	1.1
1-Feb-01	9:14:00	14.5	4.0	39.9	1.3	0.8
1-Feb-01	9:15:00	13.4	4.6	39.3	1.4	0.7
1-Feb-01	9:16:00	13.5	4.6	41.1	1.3	0.6
1-Feb-01	9:17:00	10.7	7.6	46.2	1.3	0.4
1-Feb-01	9:18:00	9.9	7.8	65.4	1.3	0.8
1-Feb-01	9:19:00	9.8	7.6	49.5	1.6	3.4
1-Feb-01	9:20:00	10.2	7.4	43.6	1.8	3.4
1-Feb-01	9:21:00	12.3	5.7	30.5	1.7	3.1
1-Feb-01	9:22:00	13.0	5.2	30.6	1.6	2.5
1-Feb-01	9:23:00	13.6	4.7	33.4	1.2	1.8
1-Feb-01	9:24:00	13.9	4.4	34.3	0.9	1.3
1-Feb-01	9:25:00	14.0	4.3	35.3	0.6	1.0
1-Feb-01	9:26:00	14.2	4.1	35.2	0.4	0.7
1-Feb-01	9:27:00	14.5	3.9	34.2	0.3	0.6
1-Feb-01	9:28:00	13.9	4.2	34.1	0.1	0.4
1-Feb-01	9:29:00	13.8	4.3	36.0	0.2	0.3
1-Feb-01	9:30:00	14.5	3.9	34.4	0.3	0.5
1-Feb-01	9:31:00	10.3	7.9	143.0	0.3	0.5
1-Feb-01	9:32:00	9.1	8.0	203.9	0.3	0.5
1-Feb-01	9:33:00	8.6	8.3	162.6	0.4	0.4
1-Feb-01	9:34:00	10.3	7.2	117.7	0.4	0.9
1-Feb-01	9:35:00	12.2	5.9	51.4	0.4	2.1
1-Feb-01	9:36:00	12.8	5.3	40.8	0.6	2.6
1-Feb-01	9:37:00	13.4	4.9	42.3	0.7	2.2
1-Feb-01	9:38:00	14.0	4.4	43.6	0.6	1.8
1-Feb-01	9:39:00	14.4	4.0	40.9	0.5	1.4
1-Feb-01	9:40:00	14.2	4.4	34.8	0.6	1.1
1-Feb-01	9:41:00	10.2	7.9	66.6	0.6	1.1
1-Feb-01	9:42:00	11.0	6.8	78.1	0.6	0.7
1-Feb-01	9:43:00	9.5	8.0	67.4	0.5	1.1
1-Feb-01	9:44:00	10.4	7.3	43.6	0.6	1.6
1-Feb-01	9:45:00	11.5	6.4	36.9	0.3	2.3
1-Feb-01	9:46:00	12.4	5.7	37.5	0.3	2.2
1-Feb-01	9:47:00	13.2	5.1	37.4	0.2	1.7
1-Feb-01	9:48:00	13.6	4.7	36.9	0.1	1.3
1-Feb-01	9:49:00	14.3	4.2	34.8	-0.1	1.1
1-Feb-01	9:50:00	10.6	7.8	54.2	-0.2	0.9
1-Feb-01	9:51:00	10.5	7.3	109.1	-0.3	0.8

Malcolm Grow Medical Center - Andrews AFB, MD

Medical Waste Incinerator

CEM Responses

Run 1

Date	Time	O2	CO2	NOx	CO	SO2
1-Feb-01	9:52:00	8.9	8.5	137.7	-0.2	1.1
1-Feb-01	9:53:00	8.7	8.7	136.1	-0.1	1.8
1-Feb-01	9:54:00	10.0	7.6	106.0	-0.3	2.5
1-Feb-01	9:55:00	10.6	7.2	88.8	-0.3	2.9
1-Feb-01	9:56:00	11.0	6.9	76.1	-0.3	2.8
1-Feb-01	9:57:00	11.4	6.5	62.4	-0.1	2.4
1-Feb-01	9:58:00	11.6	6.3	52.1	0.1	2.2
1-Feb-01	9:59:00	12.2	5.9	42.1	0.2	1.9
1-Feb-01	10:00:00	12.6	5.6	39.8	0.4	1.6
1-Feb-01	10:01:00	10.9	7.4	55.9	0.3	1.4
1-Feb-01	10:02:00	9.0	8.7	106.2	0.0	1.4
1-Feb-01	10:03:00	9.6	8.1	116.8	-0.5	2.1
1-Feb-01	10:04:00	9.7	7.9	129.5	-0.8	3.7
1-Feb-01	10:05:00	10.5	7.1	103.4	-1.0	3.8
1-Feb-01	10:06:00	11.2	6.6	84.3	-0.9	3.3
1-Feb-01	10:07:00	11.9	6.0	57.1	-1.0	2.6
1-Feb-01	10:08:00	12.3	5.8	38.5	-0.8	2.2
1-Feb-01	10:09:00	12.5	5.6	43.0	-0.5	1.8
1-Feb-01	10:10:00	12.9	5.3	49.7	-0.5	1.6
Average		11.9	6.1	63.3	0.4	1.6

Malcolm Grow Medical Center - Andrews AFB, MD

Medical Waste Incinerator

CEM Responses

Run 2

Date	Time	O2	CO2	NOx	CO	SO2
1-Feb-01	10:42:00	12.6	5.6	49.3	0.7	2.8
1-Feb-01	10:43:00	13.3	5.1	50.1	0.0	2.6
1-Feb-01	10:44:00	10.3	8.0	67.3	-0.3	2.5
1-Feb-01	10:45:00	8.9	8.7	112.5	-0.2	2.7
1-Feb-01	10:46:00	9.7	7.9	98.7	-0.2	4.7
1-Feb-01	10:47:00	10.6	7.2	90.2	-0.4	4.6
1-Feb-01	10:48:00	11.6	6.4	68.9	-0.6	3.7
1-Feb-01	10:49:00	12.2	5.9	50.4	-0.6	3.2
1-Feb-01	10:50:00	12.6	5.6	36.3	-0.4	2.7
1-Feb-01	10:51:00	12.7	5.6	40.9	-0.4	2.4
1-Feb-01	10:52:00	12.9	5.4	44.4	-0.5	2.1
1-Feb-01	10:53:00	13.5	5.0	48.6	-0.6	2.0
1-Feb-01	10:54:00	10.0	8.3	75.4	-0.8	1.9
1-Feb-01	10:55:00	9.1	8.7	100.2	-0.9	2.0
1-Feb-01	10:56:00	10.5	7.5	89.2	-1.0	5.1
1-Feb-01	10:57:00	11.3	6.8	70.2	-0.9	5.5
1-Feb-01	10:58:00	12.2	6.1	48.1	-0.9	4.6
1-Feb-01	10:59:00	12.5	5.8	38.2	-0.7	3.8
1-Feb-01	11:00:00	12.9	5.4	43.1	-0.6	3.1
1-Feb-01	11:01:00	13.5	4.9	50.8	-0.7	2.7
1-Feb-01	11:02:00	13.8	4.7	50.8	-0.8	2.2
1-Feb-01	11:03:00	13.8	4.6	48.4	-1.0	2.0
1-Feb-01	11:04:00	10.6	7.7	66.6	-1.0	1.7
1-Feb-01	11:05:00	6.2	10.7	126.9	-0.9	2.6
1-Feb-01	11:06:00	10.0	7.7	102.4	-0.8	17.0
1-Feb-01	11:07:00	11.5	6.5	80.2	-0.8	15.1
1-Feb-01	11:08:00	12.3	5.9	51.6	-0.6	12.1
1-Feb-01	11:09:00	12.5	5.7	36.9	-0.2	10.0
1-Feb-01	11:10:00	12.9	5.4	36.1	0.2	8.3
1-Feb-01	11:11:00	13.2	5.1	39.9	0.2	6.7
1-Feb-01	11:12:00	13.5	4.9	44.9	-0.3	6.0
1-Feb-01	11:13:00	13.8	4.7	44.3	-0.8	5.1
1-Feb-01	11:14:00	14.1	4.5	43.8	-1.1	4.1
1-Feb-01	11:15:00	13.2	5.4	39.2	-1.2	3.2
1-Feb-01	11:16:00	9.2	8.9	180.0	-1.1	2.7
1-Feb-01	11:17:00	11.3	6.8	96.5	-1.0	2.8
1-Feb-01	11:18:00	11.6	6.4	57.3	-0.7	3.9
1-Feb-01	11:19:00	12.5	5.7	36.6	-0.4	3.9
1-Feb-01	11:20:00	12.9	5.4	38.0	-0.5	3.5
1-Feb-01	11:21:00	13.3	5.1	43.9	-0.6	3.2

Malcolm Grow Medical Center - Andrews AFB, MD

Medical Waste Incinerator

CEM Responses

Run 2

Date	Time	O2	CO2	NOx	CO	SO2
1-Feb-01	11:22:00	13.7	4.8	42.8	-1.0	2.8
1-Feb-01	11:23:00	13.9	4.6	40.6	-1.0	2.4
1-Feb-01	11:24:00	14.1	4.5	40.9	-1.0	2.2
1-Feb-01	11:25:00	14.2	4.3	40.2	-1.0	2.0
1-Feb-01	11:26:00	14.6	4.2	38.7	-1.0	1.8
1-Feb-01	11:27:00	9.7	8.5	59.1	-1.0	1.6
1-Feb-01	11:28:00	8.1	9.2	113.0	-0.8	1.7
1-Feb-01	11:29:00	9.5	8.1	120.7	-0.9	5.6
1-Feb-01	11:30:00	10.2	7.6	114.8	-1.0	7.5
1-Feb-01	11:31:00	11.1	6.9	95.5	-1.0	7.1
1-Feb-01	11:32:00	11.5	6.6	79.9	-0.7	6.0
1-Feb-01	11:33:00	11.6	6.5	69.1	-0.3	4.7
1-Feb-01	11:34:00	11.6	6.5	60.2	0.2	3.9
1-Feb-01	11:35:00	12.0	6.2	49.3	0.8	3.6
1-Feb-01	11:36:00	12.0	6.2	41.3	1.2	3.4
1-Feb-01	11:37:00	12.4	5.9	39.3	1.1	3.2
1-Feb-01	11:38:00	12.3	5.9	43.5	0.6	2.9
1-Feb-01	11:39:00	12.5	5.8	45.4	0.0	2.6
1-Feb-01	11:40:00	12.9	5.4	45.1	-0.5	2.3
1-Feb-01	11:41:00	13.3	5.1	46.6	-0.8	2.0
Average		11.9	6.2	62.7	-0.5	4.2

Malcolm Grow Medical Center - Andrews AFB, MD

Medical Waste Incinerator

CEM Responses

Run 3

Date	Time	O2	CO2	NOx	CO	SO2
2-Feb-01	9:48:00	8.0	9.0	90.0	-0.4	1.1
2-Feb-01	9:49:00	11.0	6.7	45.5	-0.4	1.6
2-Feb-01	9:50:00	12.5	5.6	39.6	-0.5	1.6
2-Feb-01	9:51:00	13.1	5.1	38.3	-0.6	1.4
2-Feb-01	9:52:00	13.7	4.7	36.8	-0.5	1.2
2-Feb-01	9:53:00	13.9	4.5	36.2	-0.5	1.0
2-Feb-01	9:54:00	14.0	4.8	40.0	0.0	1.0
2-Feb-01	9:55:00	14.3	4.8	40.0	0.0	1.0
2-Feb-01	9:56:00	14.4	4.4	35.0	0.0	1.0
2-Feb-01	9:57:00	13.8	7.6	55.0	0.0	2.0
2-Feb-01	9:58:00	13.8	9.6	75.0	0.0	2.0
2-Feb-01	9:59:00	10.0	8.0	90.0	0.0	2.0
2-Feb-01	10:00:00	10.0	6.4	70.0	0.0	1.5
2-Feb-01	10:01:00	10.3	5.2	50.0	0.0	1.5
2-Feb-01	10:02:00	10.5	4.8	35.0	0.0	1.5
2-Feb-01	10:03:00	12.0	4.4	40.0	0.0	1.5
2-Feb-01	10:04:00	12.8	6.0	45.0	0.0	1.5
2-Feb-01	10:05:00	13.5	10.4	40.0	0.0	1.5
2-Feb-01	10:06:00	14.0	8.4	35.0	0.0	1.5
2-Feb-01	10:07:00	13.8	6.4	105.0	0.0	1.5
2-Feb-01	10:08:00	6.5	6.4	110.0	0.0	1.5
2-Feb-01	10:09:00	10.8	6.0	100.0	0.0	1.5
2-Feb-01	10:10:00	11.8	5.6	60.0	0.0	1.5
2-Feb-01	10:11:00	12.0	5.2	55.0	0.0	1.5
2-Feb-01	10:12:00	12.0	8.0	45.0	0.0	1.5
2-Feb-01	10:13:00	12.3	8.0	40.0	0.0	1.5
2-Feb-01	10:14:00	13.0	7.6	40.0	0.0	1.5
2-Feb-01	10:15:00	13.5	8.4	40.0	0.0	1.5
2-Feb-01	10:16:00	13.3	6.8	35.0	0.0	1.5
2-Feb-01	10:17:00	10.0	6.8	100.0	0.0	1.5
2-Feb-01	10:18:00	10.3	6.4	100.0	0.0	2.0
2-Feb-01	10:19:00	8.3	6.4	95.0	0.0	2.0
2-Feb-01	10:20:00	10.8	6.0	95.0	0.0	2.0
2-Feb-01	10:21:00	11.0	6.0	80.0	0.0	2.0
2-Feb-01	10:22:00	11.5	5.6	45.0	0.0	2.0
2-Feb-01	10:23:00	11.5	4.8	40.0	0.0	2.0
2-Feb-01	10:24:00	12.0	9.2	45.0	0.0	1.5
2-Feb-01	10:25:00	12.3	7.2	50.0	0.0	1.5
2-Feb-01	10:26:00	12.5	8.0	50.0	0.0	1.5
2-Feb-01	10:27:00	8.3	7.2	150.0	0.0	1.0

Malcolm Grow Medical Center - Andrews AFB, MD

Medical Waste Incinerator

CEM Responses

Run 3

Date	Time	O2	CO2	NOx	CO	SO2
2-Feb-01	10:28:00	9.8	5.2	200.0	0.0	2.0
2-Feb-01	10:29:00	9.5	4.8	135.0	0.0	3.0
2-Feb-01	10:30:00	10.3	8.8	125.0	0.0	3.0
2-Feb-01	10:31:00	11.0	9.6	85.0	0.0	2.5
2-Feb-01	10:32:00	12.5	8.8	65.0	0.0	2.0
2-Feb-01	10:33:00	8.5	8.0	50.0	0.5	1.5
2-Feb-01	10:34:00	6.8	6.8	35.0	1.0	1.5
2-Feb-01	10:35:00	9.0	6.0	40.0	0.5	1.0
2-Feb-01	10:36:00	10.0	5.6	40.0	0.0	2.0
2-Feb-01	10:37:00	11.0	5.2	145.0	0.0	2.0
2-Feb-01	10:38:50	9.1	8.3	120.4	-0.1	2.1
2-Feb-01	10:39:50	10.4	7.4	107.6	0.0	2.2
2-Feb-01	10:40:50	11.2	6.7	84.6	-0.2	2.1
2-Feb-01	10:41:50	11.9	6.2	63.3	-0.2	2.0
2-Feb-01	10:42:50	12.4	5.8	38.9	0.0	1.8
2-Feb-01	10:43:50	12.5	5.7	32.3	0.2	1.6
2-Feb-01	10:44:50	12.7	5.5	40.8	0.2	1.5
2-Feb-01	10:45:50	13.0	5.3	45.7	0.1	1.3
2-Feb-01	10:46:50	13.3	5.0	48.6	0.0	1.4
2-Feb-01	10:47:50	13.8	4.7	46.0	-0.2	1.3
Average		11.5	6.5	66.1	0.0	1.7

Malcolm Grow Medical Center - Andrews AFB, MD

Medical Waste Incinerator

Oxygen Analyzer Drift Calculations and Gas Corrections

1-Feb-01

Calibration Gases	System Calibration	Direct Calibration
0.0 %	0.1	0.0
12.53 %	12.4	12.5
22.4 %		22.5

	System		Direct
Correlation	1.000000	Correlation	0.99999
Slope	0.981644	Slope	1.004162
Intercept	0.100000	Intercept	-0.025126

Sampling System Bias	Calibration Error
0.40%	0.00%
0.40%	0.12%
	0.40%

Pre Cal	0.1		
	12.4		
Run 1	11.9	Corrected	12.0 % O_2
Post Cal	0.1	Drift	0.00%
	12.5		0.40%
Run 2	11.9	Corrected	12.2 % O_2
Post Cal	0.10	Drift	0.00%
	12.10		1.60%

Malcolm Grow Medical Center - Andrews AFB, MD

Medical Waste Incinerator

Oxygen Analyzer Drift Calculations and Gas Corrections

2-Feb-01

Calibration Gases	System Calibration	Direct Calibration
0.0 %	0.0	0.0
12.53 %	12.1	12.5
22.4 %		22.4

	System	Direct
Correlation	1.000000	0.999999
Slope	0.965682	0.999894
Intercept	0.000000	-0.008771

Sampling System Bias	Calibration Error
0.00%	0.00%
1.60%	0.12%
	0.00%

Pre Cal	0.0		
	12.1		
Run 3	11.5	Corrected	11.8 % O_2
Post Cal	0.1	Drift	0.40%
	12.3		0.80%

Malcolm Grow Medical Center - Andrews AFB, MD

Medical Waste Incinerator

Carbon Dioxide Analyzer Drift Calculations and Gas Corrections

1-Feb-01

Calibration Gases	System Calibration	Direct Calibration
0.0 %	1.0	0.0
10.04 %	10.1	10.1
22.4 %		22.4

Correlation	1.000000	Correlation	0.999995
Slope	0.906375	Slope	0.999816
Intercept	1.000000	Intercept	0.021993
Sampling System Bias		Calibration Error	
4.00%		0.00%	
0.00%		0.24%	
		0.00%	

Pre Cal	0.0		
	10.1		
Run 1	6.1	Corrected	6.0 % CO_2
Post Cal	0.1	Drift	0.40%
	10.2		0.40%
Run 2	6.2	Corrected	6.1 % CO_2
Post Cal	0.20	Drift	0.40%
	10.00		0.80%

Malcolm Grow Medical Center - Andrews AFB, MD

Medical Waste Incinerator

Carbon Dioxide Analyzer Drift Calculations and Gas Corrections

2-Feb-01

Calibration Gases	System Calibration	Direct Calibration
0.0 %	0.1	0.0
10.04 %	9.9	10.1
22.4 %		22.3

	System		Direct
Correlation	1.000000	Correlation	0.999985
Slope	0.976096	Slope	0.995214
Intercept	0.100000	Intercept	0.038422

Sampling System Bias	Calibration Error
0.40%	0.00%
0.80%	0.24%
	0.40%

Pre Cal	0.1		
	9.9		
Run 3	6.5	Corrected	6.5 % CO_2
Post Cal	0.3	Drift	0.80%
	10.0		0.40%

Malcolm Grow Medical Center - Andrews AFB, MD

Medical Waste Incinerator

Nitrogen Oxides Analyzer Drift Calculations and Gas Corrections

1-Feb-01

Calibration Gases	System Calibration	Direct Calibration
0.0 ppm	-0.5	0.2
254.1 ppm	248.2	252.7
472.4 ppm		472.9

	System Calibration		Direct Calibration
Correlation	1.000000	Correlation	0.999991
Slope	0.978749	Slope	1.000447
Intercept	-0.500000	Intercept	-0.341592

Sampling System Bias	Calibration Error
0.14%	0.04%
0.90%	0.28%
	0.10%

Pre Cal	-0.5		
	248.2		
Run 1	**63.3**	**Corrected**	**65.3 ppm NO_x**
Post Cal	-0.4	Drift	0.02%
	247.4		0.16%
Run 2	**62.7**	**Corrected**	**62.4 ppm NO_x**
Post Cal	4.90	Drift	1.06%
	249.30		0.38%

Malcolm Grow Medical Center - Andrews AFB, MD

Medical Waste Incinerator

Nitrogen Oxides Analyzer Drift Calculations and Gas Corrections

2-Feb-01

Calibration Gases	System Calibration	Direct Calibration
0.0 ppm	-0.1	-0.4
254.1 ppm	249.9	472.3
472.4 ppm		253.5

Correlation	1.000000
Slope	0.983865
Intercept	-0.100000

Sampling System Bias
0.06%
44.48%

Correlation	0.573006
Slope	0.573348
Intercept	102.9543

Calibration Error
0.08%
43.64%
43.78%

Pre Cal	-0.1 249.9		
Run 3	66.1	Corrected	67.6 ppm NO_x
Post Cal	-0.4 248.5	Drift	0.06% 0.28%

Malcolm Grow Medical Center - Andrews AFB, MD

Medical Waste Incinerator

Carbon Monoxide Analyzer Drift Calculations and Gas Corrections

1-Feb-01

Calibration Gases	System Calibration	Direct Calibration
0.0 ppm	2.1	-0.4
30.2 ppm	29.1	30.0
59.5 ppm		60.0
89.7 ppm		90.7

System Calibration		Direct Calibration	
Correlation	1.000000	Correlation	0.999995
Slope	0.894040	Slope	1.016406
Intercept	2.100000	Intercept	-0.510816
Sampling System Bias		Calibration Error	
2.50%		0.40%	
0.90%		0.20%	
		0.50%	
		1.00%	

Pre Cal	2.1		
	29.1		
Run 1	0.4	Corrected	-0.8 ppm CO
Post Cal	0.1	Drift	2.00%
	26.5		2.60%
Run 2	-0.5	Corrected	-0.7 ppm CO
Post Cal	0.10	Drift	0.00%
	26.50		0.00%

Malcolm Grow Medical Center - Andrews AFB, MD

Medical Waste Incinerator

Carbon Monoxide Analyzer Drift Calculations and Gas Corrections

2-Feb-01

Calibration Gases	System Calibration	Direct Calibration
0.0 ppm	-0.5	0.8
30.2 ppm	29.7	30.7
59.5 ppm		60.9
89.7 ppm		90.9

Correlation	1.000000
Slope	1.000000
Intercept	-0.500000

Sampling System Bias
1.30%
1.00%

Correlation	0.99997
Slope	1.006991
Intercept	0.661463

Calibration Error
0.80%
0.50%
1.40%
1.20%

Pre Cal	-0.5		
	29.7		
Run 3	0.0	Corrected	0.0 ppm CO
Post Cal	0.4	Drift	0.90%
	30.4		0.70%

Malcolm Grow Medical Center - Andrews AFB, MD

Medical Waste Incinerator

Sulfur Dioxide Analyzer Drift Calculations and Gas Corrections

1-Feb-01

Calibration Gases	System Calibration	Direct Calibration
0.0 ppm	2.1	-0.2
45.1 ppm	41.2	44.9
91.7 ppm		92.1

	System		Direct
Correlation	1.000000	Correlation	0.999993
Slope	0.866962	Slope	1.006578
Intercept	2.100000	Intercept	-0.299964
Sampling System Bias		Calibration Error	
2.30%		0.20%	
3.70%		0.20%	
		0.40%	

Pre Cal	2.1		
	41.2		
Run 1	1.6	Corrected	-0.6 ppm SO_2
Post Cal	2.2	Drift	0.10%
	41.0		0.20%
Run 2	4.2	Corrected	2.1 ppm SO_2
Post Cal	2.60	Drift	0.40%
	41.20		0.20%

Malcolm Grow Medical Center - Andrews AFB, MD

Medical Waste Incinerator

Sulfur Dioxide Analyzer Drift Calculations and Gas Corrections

2-Feb-01

Calibration Gases	System Calibration	Direct Calibration
0.0 ppm	3.0	0.1
45.1 ppm	41.3	45.1
91.7 ppm		91.5

Correlation	1.000000	Correlation	1
Slope	0.849224	Slope	0.996723
Intercept	3.000000	Intercept	0.116107

Sampling System Bias	Calibration Error
2.90%	0.10%
3.80%	0.00%
	0.20%

Pre Cal	3.0		
	41.3		
Run 3	1.7	Corrected	-2.0 ppm SO_2
Post Cal	3.7	Drift	0.70%
	41.0		0.30%

Appendix B.5

Raw Field Data

Visible Emissions (M9)

VISIBLE EMISSIONS EVALUATOR

This is to certify that

Bill Dunstan, Jr.

met the specifications of Federal Reference Method 9 and qualified as a visible emissions evaluator. Maximum deviation on white and black smoke did not exceed 7.5% opacity and no single error exceeding 15% opacity was incurred during the certification test conducted by Eastern Technical Associates of Raleigh, North Carolina. This certificate is valid for six months from date of issue.

281351	Springfield, Virginia	October 18, 2000
Certificate Number	Location	Date of Issue

Thomas Hose
President

Michael W. Lunsford
Director of Training

6-MINUTE AVERAGES
ANDREWS AFB, MD
HOSPITAL INCINERATOR, BUILDING 1055

2/1/01, 1440-1510	
six-minute interval	six-minute average
0-6	0
6-12	0
12-18	0
18-24	0
24-30	0
Total Avg.	0

2/1/01, 1510-1540	
six-minute interval	six-minute average
30-36	0
36-42	0
42-48	0
48-54	0
54-60	0
Total Avg.	0

2/1/01, 1540-1610	
six-minute interval	six-minute average
60-66	0
66-72	0
72-78	0
78-84	0
84-90	0
Total Avg.	0

2/1/01, 1610-1640	
six-minute interval	six-minute average
90-96	0
96-102	0
102-108	0
108-114	0
114-120	0
Total Avg.	0

2/2/01, 945-1015	
six-minute interval	six-minute average
0-6	0
6-12	0
12-18	0
18-24	0
24-30	0
Total Avg.	0

2/2/01, 1015-1045	
six-minute interval	six-minute average
30-36	0
36-42	0
42-48	0
48-54	0
54-60	0
Total Avg.	0

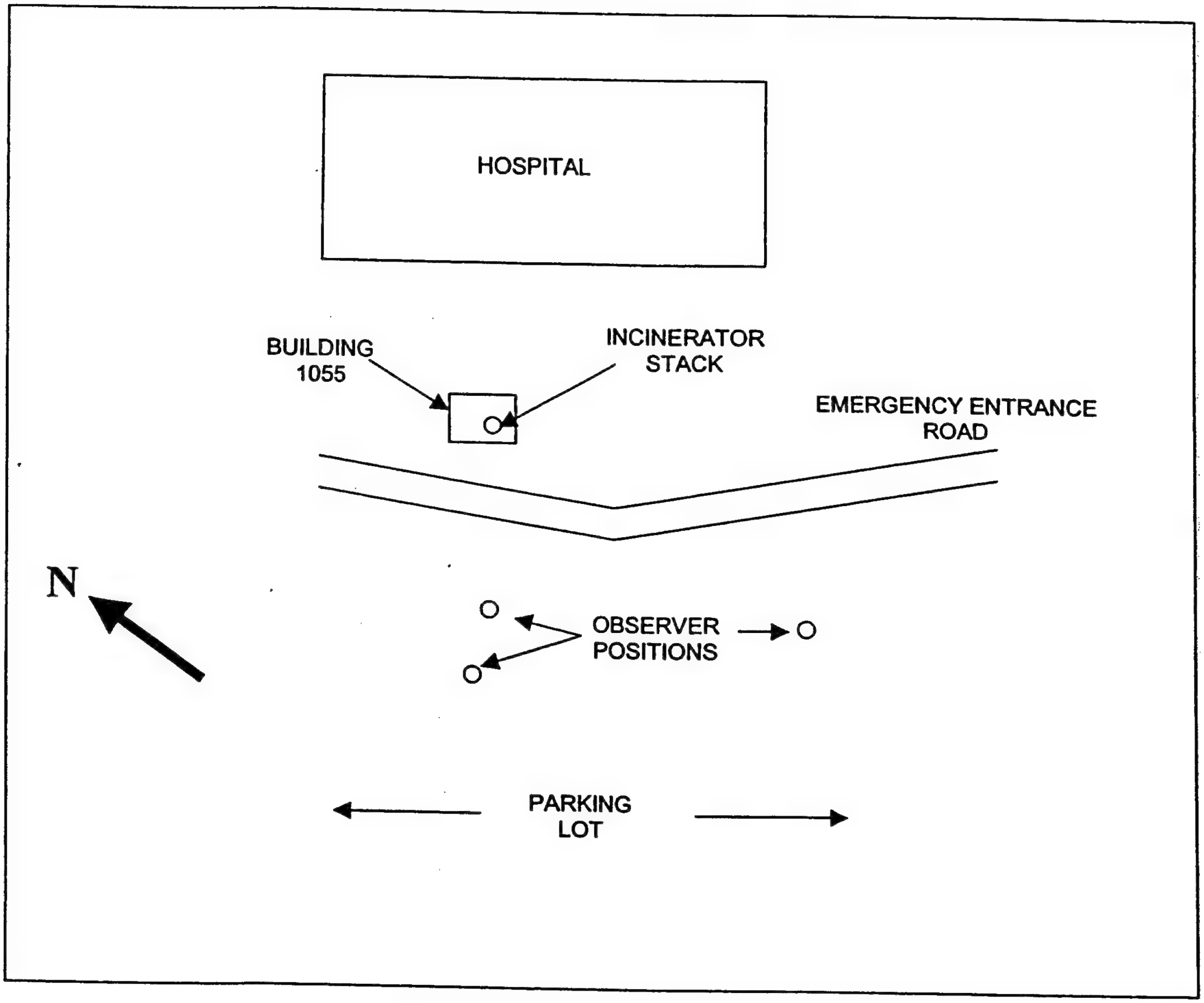
2/2/01, 1225-1255	
six-minute interval	six-minute average
60-66	0
66-72	0
72-78	0
78-84	0
84-90	0
Total Avg.	0

2/2/01, 1255-1325	
six-minute interval	six-minute average
90-96	0
96-102	0
102-108	0
108-114	0
114-120	0
Total Avg.	0

2/2/01, 1405-1435	
six-minute interval	six-minute average
120-126	0
126-132	0
132-138	0
138-144	0
144-150	0
Total Avg.	0

2/2/01, 1435-1505	
six-minute interval	six-minute average
150-156	0
156-162	0
162-168	0
168-174	0
174-180	0
Total Avg.	0

ANDREWS AFB, MD
HOSPITAL WASTE INCINERATOR – BUILDING 1055



EPA

VISIBLE EMISSION OBSERVATION FORM 1

Form Number	Page	Of

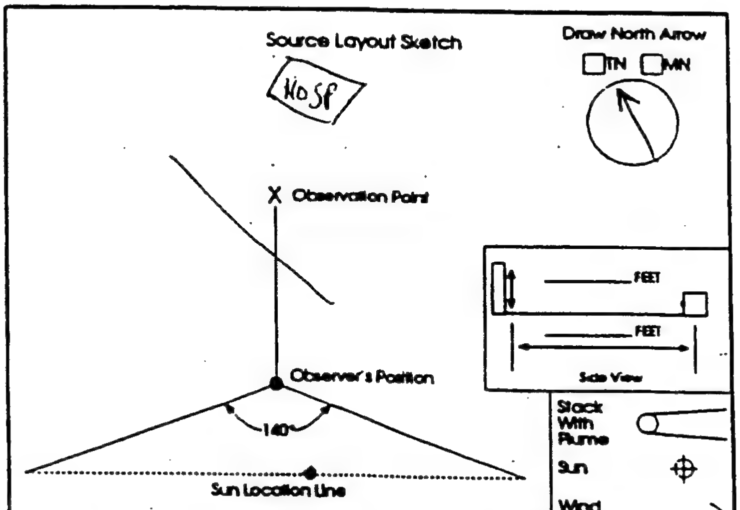
Continued on VEO Form Number:

Method Used (Circle One): **Method 9** (circled) 203A 203B Other: ____

Field	Value
Company Name	Andrews AFB
Facility Name	Hospital Incinerator – Bldg. 1055
Street Address	
City	Andrews AFB
State	MD
Zip	
Process	waste incineration
Unit #	
Operating Mode	
Control Equipment	Scrubber
Operating Mode	
Describe Emission Point	southernmost stack

	Start	End
Height of Emiss. Pt.	30'	same
Height of Emiss. Pt. Rel. to Observer	25'	same
Distance to Emiss. Pt.	60'	same
Direction to Emiss. Pt. (Degrees)	35° NE	same
Vertical Angle to Obs. Pt.	20°	same
Direction to Obs. Pt. (Degrees)	35° NE	same
Distance and Direction to Observation Point from Emission Point	15' above	same
Describe Emissions	none (steam)	same
Emission Color	——	same
Describe Plume Background	sky	same
Background Color	blue grey	same
Sky Conditions	Pt. cloudy	same
Wind Speed	1-3	same
Wind Direction	NE	same
Ambient Temp.		same
Wet Bulb Temp.		
RH Percent		

Water Droplet Plume: Attached ☒ Detached ☐ None ☐



Longitude	Latitude	Declination

Additional Information:

Observation Date	Time Zone	Start Time	End Time
2/1/01	EST	1440	1510

Min \ Sec	0	15	30	45	Comments
1	0	0	0	0	
2	0	0	0	0	
3	0	0	0	0	
4	0	0	0	0	
5	0	0	0	0	
6	0	0	0	0	
7	0	0	0	0	
8	0	0	0	0	
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12	0	0	0	0	
13	0	0	0	0	
14	0	0	0	0	
15	0	0	0	0	
16	0	0	0	0	
17	0	0	0	0	
18	0	0	0	0	
19	0	0	0	0	
20	0	0	0	0	
21	0	0	0	0	
22	0	0	0	0	
23	0	0	0	0	
24	0	0	0	0	
25	0	0	0	0	
26	0	0	0	0	
27	0	0	0	0	
28	0	0	0	0	
29	0	0	0	0	
30	0	0	0	0	

Field	Value
Observer's Name (Print)	Bill Dunstan Jr.
Observer's Signature	William Dunstan Jr.
Date	2/1/01
Organization	Pacific Environmental Services
Certified By	Eastern Technical Associates
Date	10/18/00

VEOF1.1

EPA

VISIBLE EMISSION OBSERVATION FORM 1

Form Number	Page	Of
Continued on VEO Form Number		

Method Used (Circle One): **Method 9** 203A 203B Other:

Company Name: Andrews AFB

Facility Name: Hospital Incinerator – Bldg. 1055

Street Address:

City: Andrews AFB | State: MD | Zip:

Process: waste incineration | Unit #: | Operating Mode:

Control Equipment: Scrubber | Operating Mode:

Describe Emission Point: Southernmost stack

Height of Emiss. Pt.		Height of Emiss. Pt. Rel. to Observer	
Start 30'	End same	Start 25'	End same
Distance to Emiss. Pt.		**Direction to Emiss. Pt. (Degrees)**	
Start 60'	End same	Start 35 NE	End same
Vertical Angle to Obs. Pt.		**Direction to Obs. Pt. (Degrees)**	
Start 20°	End same	Start 35 NE	End same

Distance and Direction to Observation Point from Emission Point: Start 15' above End same

Describe Emissions: Start none (steam) End same

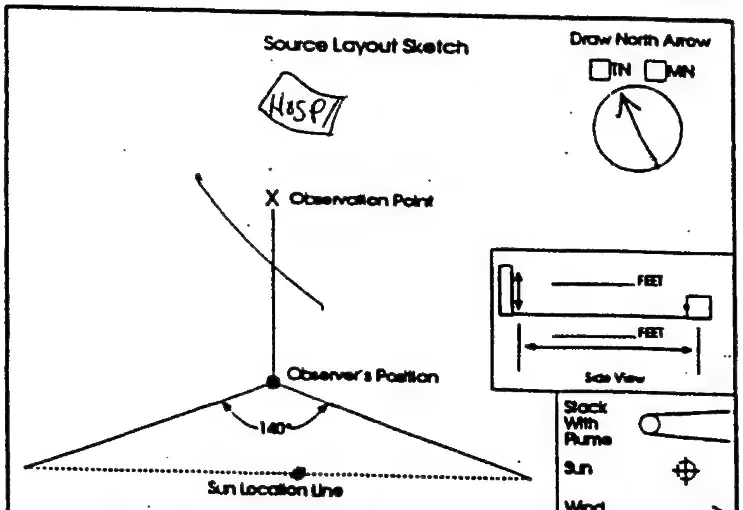
Emission Color: Start —— End same

Water Droplet Plume: Attached ☒ Detached ☐ None ☐

Describe Plume Background: Start sky End same

Background Color		Sky Conditions	
Start blue gray	End same	Start Pt cloudy	End same
Wind Speed		**Wind Direction**	
Start 1-3	End same	Start NE	End same
Ambient Temp.		**Wet Bulb Temp.**	**RH Percent**
Start	End same		

Source Layout Sketch



Longitude	Latitude	Declination

Additional Information:

Observation Date: 2/1/01 | Time Zone: EST | Start Time: 1510 | End Time: 1540

Min \ Sec	0	15	30	45	Comments
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2	0	0	0	0	
3	0	0	0	0	
4	0	0	0	0	
5	0	0	0	0	
6	0	0	0	0	
7	0	0	0	0	
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12	0	0	0	0	
13	0	0	0	0	
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16	0	0	0	0	
17	0	0	0	0	
18	0	0	0	0	
19	0	0	0	0	
20	0	0	0	0	
21	0	0	0	0	
22	0	0	0	0	
23	0	0	0	0	
24	0	0	0	0	
25	0	0	0	0	
26	0	0	0	0	
27	0	0	0	0	
28	0	0	0	0	
29	0	0	0	0	
30	0	0	0	0	

Observer's Name (Print): Bill Dunstan Jr.

Observer's Signature: William Dunstan Jr. | Date: 2/1/01

Organization: Pacific Environmental Services

Certified By: Eastern Technical Associates | Date: 10/18/00

VEOF1.1

EPA

VISIBLE EMISSION OBSERVATION FORM 1

Form Number	Page	Of

Continued on VEO Form Number:

Method Used (Circle One): Method 9 (circled) | 203A | 203B | Other: ____

Observation Date	Time Zone	Start Time	End Time
2/1/01	EST	1540	1610

Company Name: Andrews AFB

Facility Name: Hospital Incinerator – Bldg. 1055

Street Address:

City: Andrews AFB | State: MD | Zip:

Process: waste incineration | Unit #: | Operating Mode:

Control Equipment: Scrubber | Operating Mode:

Describe Emission Point: Southernmost stack

Height of Emiss. Pt.: Start 30' End Same | Height of Emiss. Pt. Rel. to Observer: Start 25' End Same

Distance to Emiss. Pt.: Start 80' End Same | Direction to Emiss. Pt. (Degrees): Start 30° NE End Same

Vertical Angle to Obs. Pt.: Start 20° End Same | Direction to Obs. Pt. (Degrees): Start 30° NE End Same

Distance and Direction to Observation Point from Emission Point: Start 15' above End Same

Describe Emissions: Start None (Steam) End Same

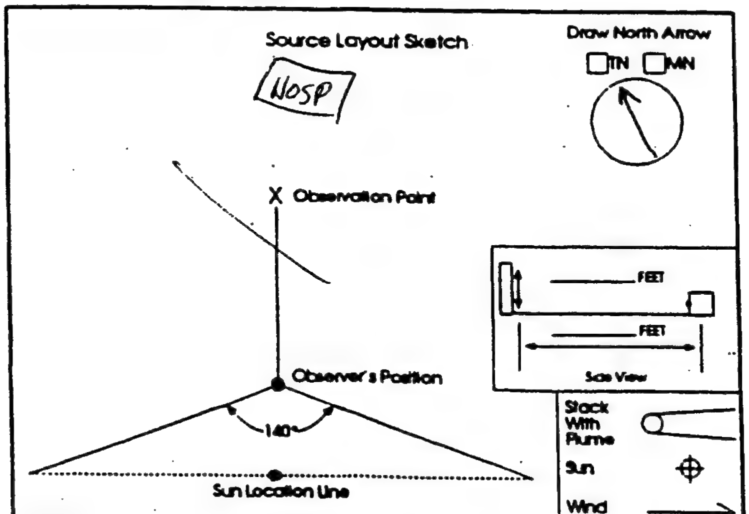
Emission Color: Start — End Same | Water Droplet Plume: Attached ☒ Detached ☐ None ☐

Describe Plume Background: Start Sky End Same

Background Color: Start blue-gray End Same | Sky Conditions: Start P. cloudy End Same

Wind Speed: Start 1-3 End Same | Wind Direction: Start NE End Same

Ambient Temp.: Start End Same | Wet Bulb Temp.: | RH Percent:



Longitude	Latitude	Declination

Additional Information:

Min \ Sec	0	15	30	45	Comments
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2	0	0	0	0	
3	0	0	0	0	
4	0	0	0	0	
5	0	0	0	0	
6	0	0	0	0	
7	0	0	0	0	
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13	0	0	0	0	
14	0	0	0	0	
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21	0	0	0	0	
22	0	0	0	0	
23	0	0	0	0	
24	0	0	0	0	
25	0	0	0	0	
26	0	0	0	0	
27	0	0	0	0	
28	0	0	0	0	
29	0	0	0	0	
30	0	0	0	0	

Observer's Name (Print): Bill Dunstan Jr.

Observer's Signature: William Dunstan Jr. | Date: 2/1/01

Organization: Pacific Environmental Services

Certified By: Eastern Technical Associates | Date: 10/18/00

VEOF1.1

EPA

VISIBLE EMISSION OBSERVATION FORM 1

Method Used (Circle One): Method 9 (circled) | 203A | 203B | Other: ____

Company Name: Andrews AFB

Facility Name: Hospital Incinerator – Bldg. 1055

Street Address:

City: Andrews AFB | State: MD | Zip:

Process: waste incineration | Unit #: | Operating Mode:

Control Equipment: Scrubber | Operating Mode:

Describe Emission Point: Southernmost stack

Height of Emiss. Pt. Start: 30'	End: Same	Height of Emiss. Pt. Rel. to Observer Start: 25'	End: Same
Distance to Emiss. Pt. Start: 80'	End: Same	Direction to Emiss. Pt. (Degrees) Start: 30° NE	End: Same
Vertical Angle to Obs. Pt. Start: 20°	End: Same	Direction to Obs. Pt. (Degrees) Start: 30° NE	End: Same

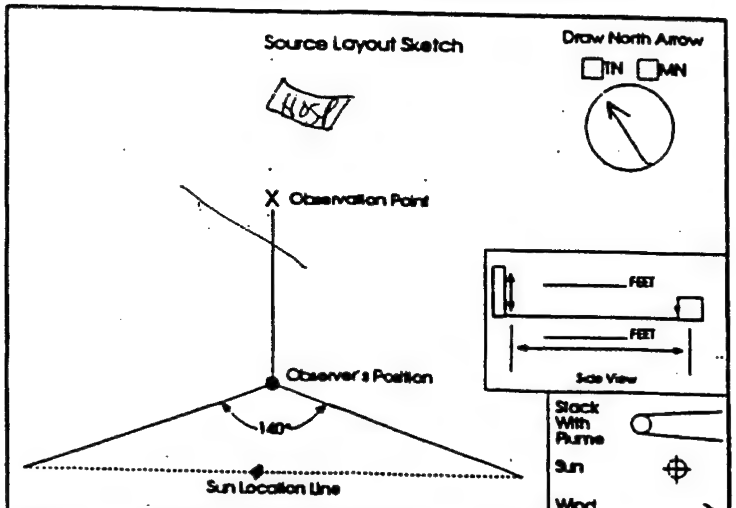
Distance and Direction to Observation Point from Emission Point: Start: 15 above | End: Same

Describe Emissions: Start: none (steam) | End: Same

Emission Color: Start: —— | End: Same | Water Droplet Plume: Attached [X] Detached [ ] None [ ]

Describe Plume Background: Start: sky | End: Same

Background Color Start: blue gray	End: Same	Sky Conditions Start: Pt. cloudy	End: Same
Wind Speed Start: 1-3	End: Same	Wind Direction Start: NE	End: Same
Ambient Temp. Start:	End: Same	Wet Bulb Temp.	RH Percent



Longitude: | Latitude: | Declination:

Additional Information:

VEOF1.1

Form Number		Page	Of
Continued on VEO Form Number			

Observation Date	Time Zone	Start Time	End Time
2/1/01	EST	1610	1640

Min \ Sec	0	15	30	45	Comments
1	0	0	0	0	
2	0	0	0	0	
3	0	0	0	0	
4	0	0	0	0	
5	0	0	0	0	
6	0	0	0	0	
7	0	0	0	0	
8	0	0	0	0	
9	0	0	0	0	
10	0	0	0	0	
11	0	0	0	0	
12	0	0	0	0	
13	0	0	0	0	
14	0	0	0	0	
15	0	0	0	0	
16	0	0	0	0	
17	0	0	0	0	
18	0	0	0	0	
19	0	0	0	0	
20	0	0	0	0	
21	0	0	0	0	
22	0	0	0	0	
23	0	0	0	0	
24	0	0	0	0	
25	0	0	0	0	
26	0	0	0	0	
27	0	0	0	0	
28	0	0	0	0	
29	0	0	0	0	
30	0	0	0	0	

Observer's Name (Print): Bill Dunstan Jr.

Observer's Signature: William Dunstan Jr. | Date: 2/1/01

Organization: Pacific Environmental Services

Certified By: Eastern Technical Associates | Date: 10/18/00

EPA

VISIBLE EMISSION OBSERVATION FORM 1

Form Number	Page	Of

Continued on VEO Form Number

Method Used (Circle One): **Method 9** (circled) 203A 203B Other: ____

Company Name	Andrews AFB
Facility Name	Hospital Incinerator - Bldg. 1055
Street Address	

City	State	Zip
Andrews AFB	MD	

Process	Unit #	Operating Mode
waste incineration		
Control Equipment		**Operating Mode**
Scrubber		

Describe Emission Point: southernmost stack

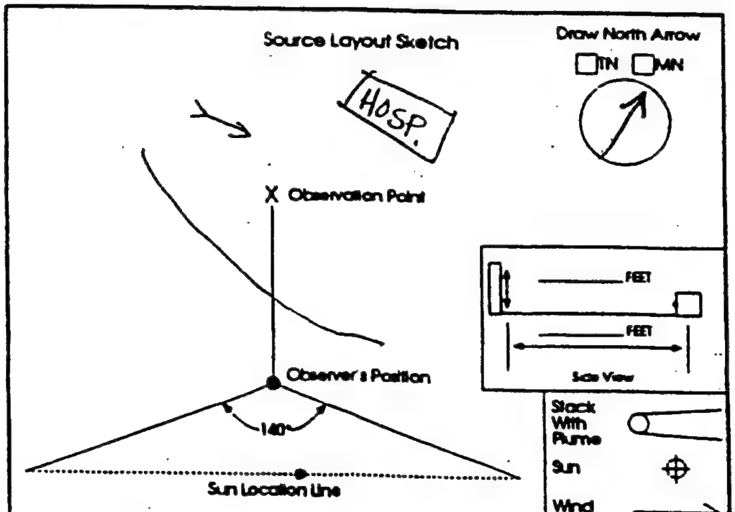
Height of Emiss. Pt.		Height of Emiss. Pt. Rel. to Observer	
Start 30'	End same	Start 25'	End same
Distance to Emiss. Pt.		**Direction to Emiss. Pt. (Degrees)**	
Start 100'	End same	Start 344° NW	End same

Vertical Angle to Obs. Pt.		Direction to Obs. Pt. (Degrees)	
Start 20°	End same	Start 10NE	End same
Distance and Direction to Observation Point from Emission Point			
Start 20 - 30' E		End same	

Describe Emissions			
Start none (steam)		End same	
Emission Color		**Water Droplet Plume**	
Start —	End same	Attached ☒ Detached ☐ None ☐	

Describe Plume Background			
Start sky		End same	
Background Color		**Sky Conditions**	
Start blue/white	End same	Start p. cloudy	End same
Wind Speed		**Wind Direction**	
Start 1-3	End same	Start E	End same
Ambient Temp.		**Wet Bulb Temp.**	**RH Percent**
Start 10°C	End same		

Source Layout Sketch



Longitude	Latitude	Declination

Additional Information

Observation Date	Time Zone	Start Time	End Time
2/2/01	EST	945	1015

Min \ Sec	0	15	30	45	Comments
1	0	0	0	0	
2	0	0	0	0	
3	0	0	0	0	
4	0	0	0	0	
5	0	0	0	0	
6	0	0	0	0	
7	0	0	0	0	
8	0	0	0	0	
9	0	0	0	0	
10	0	0	0	0	
11	0	0	0	0	
12	0	0	0	0	
13	0	0	0	0	
14	0	0	0	0	
15	0	0	0	0	
16	0	0	0	0	
17	0	0	0	0	
18	0	0	0	0	
19	0	0	0	0	
20	0	0	0	0	
21	0	0	0	0	
22	0	0	0	0	
23	0	0	0	0	
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26	0	0	0	0	
27	0	0	0	0	
28	0	0	0	0	
29	0	0	0	0	
30	0	0	0	0	

Observer's Name (Print)	Bill Dunstan Jr.
Observer's Signature	William Dunstan Jr.
Date	2/2/01
Organization	Pacific Environmental Services
Certified By	Eastern Technical Associates
Date	10/18/2000

VEOF1.1

EPA

VISIBLE EMISSION OBSERVATION FORM 1

Form Number	Page	Of

Continued on VEO Form Number

Method Used (Circle One): Method 9 (circled) 203A 203B Other: ______

Company Name: Andrews AFB

Facility Name: Hospital Incinerator – Bldg. 1055

Street Address:

City: Andrews AFB State: MD Zip:

Process: waste incineration Unit #: Operating Mode:

Control Equipment: Scrubber Operating Mode:

Describe Emission Point: Southernmost stack

Height of Emiss. Pt. Start 30' End same

Height of Emiss. Pt. Rel. to Observer Start 25' End same

Distance to Emiss. Pt. Start 100' End same

Direction to Emiss. Pt. (Degrees) Start 344° NW End same

Vertical Angle to Obs. Pt. Start 20° End same

Direction to Obs. Pt. (Degrees) Start 10° NE End same

Distance and Direction to Observation Point from Emission Point Start 20-30' E End same

Describe Emissions Start none (steam) End same

Emission Color Start — End same

Water Droplet Plume: Attached ☒ Detached ☐ None ☐

Describe Plume Background Start sky End same

Background Color Start blue/white End same

Sky Conditions Start Pt. cloudy End same

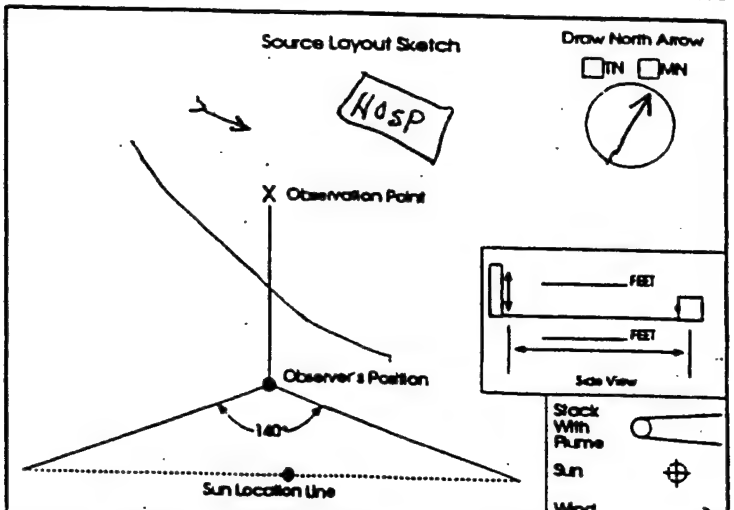
Wind Speed Start 1-3 End same

Wind Direction Start E End same

Ambient Temp. Start 9°C End same

Wet Bulb Temp.

RH Percent



Longitude | Latitude | Declination

Additional Information

Observation Date: 2/2/01 Time Zone: EST Start Time: 1015 End Time: 1045

Min \ Sec	0	15	30	45	Comments
1	0	0	0	0	
2	0	0	0	0	
3	0	0	0	0	
4	0	0	0	0	
5	0	0	0	0	
6	0	0	0	0	
7	0	0	0	0	
8	0	0	0	0	
9	0	0	0	0	
10	0	0	0	0	
11	0	0	0	0	
12	0	0	0	0	
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26	0	0	0	0	
27	0	0	0	0	
28	0	0	0	0	
29	0	0	0	0	
30	0	0	0	0	

Observer's Name (Print): Bill Dunstan Jr.

Observer's Signature: William Dunstan Jr. Date: 2/2/01

Organization: Pacific Environmental Services

Certified By: Eastern Technical Associates Date: 10/18/00

VEOF1.1

EPA

VISIBLE EMISSION OBSERVATION FORM 1

Method Used (Circle One): Method 9 (circled) | 203A | 203B | Other: ______

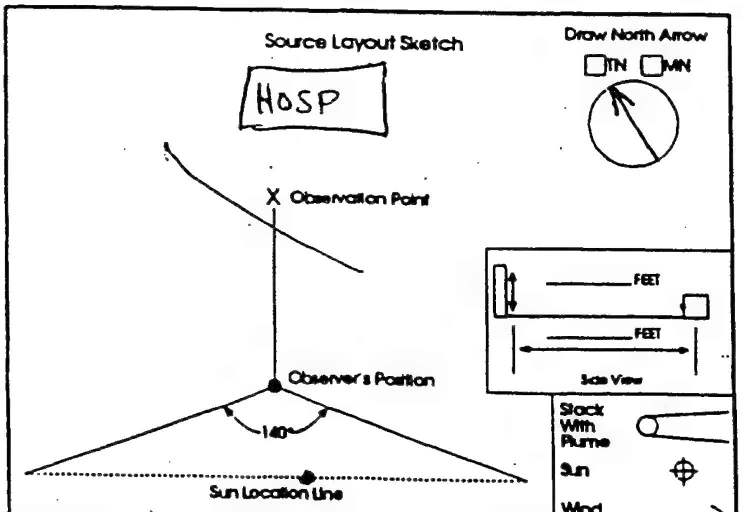
Company Name	Andrews AFB
Facility Name	Hospital Incinerator – Bldg. 1055
Street Address	
City: Andrews AFB	State: MD · Zip:

Process	Unit #	Operating Mode
waste incineration		
Control Equipment: Scrubber		Operating Mode:

Describe Emission Point: Southernmost stack

Height of Emiss. Pt. Start 30' End Same	Height of Emiss. Pt. Rel. to Observer Start 25' End Same
Distance to Emiss. Pt. Start 80' End Same	Direction to Emiss. Pt. (Degrees) Start 30°NE End Same
Vertical Angle to Obs. Pt. Start 20° End Same	Direction to Obs. Pt. (Degrees) Start 45°NE End Same
Distance and Direction to Observation Point from Emission Point Start 15' E	End Same
Describe Emissions Start none (steam)	End Same
Emission Color Start — End Same	Water Droplet Plume Attached [X] Detached [ ] None [ ]
Describe Plume Background Start sky	End Same
Background Color Start blue End Same	Sky Conditions Start p. cloudy End Same
Wind Speed Start 1-3 End Same	Wind Direction Start E End Same
Ambient Temp. Start 11°C End Same	Wet Bulb Temp. · RH Percent

Source Layout Sketch · Draw North Arrow [ ] TN [ ] MN



Longitude	Latitude	Declination

Additional Information:

Form Number ______ Page ___ Of ___

Continued on VEO Form Number ______

Observation Date	Time Zone	Start Time	End Time
2/2/01	EST	1225	1255

Min \ Sec	0	15	30	45	Comments
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2	0	0	0	0	
3	0	0	0	0	
4	0	0	0	0	
5	0	0	0	0	
6	0	0	0	0	
7	0	0	0	0	
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14	0	0	0	0	
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26	0	0	0	0	
27	0	0	0	0	
28	0	0	0	0	
29	0	0	0	0	
30	0	0	0	0	

Observer's Name (Print): Bill Dunstan Jr.

Observer's Signature: William Dunstan Jr. · Date: 2/2/01

Organization: Pacific Environmental Services

Certified By: Eastern Technical Associates · Date: 6/18/00

VEOF1.1

EPA

VISIBLE EMISSION OBSERVATION FORM 1

Form Number	Page	Of

Continued on VEO Form Number:

Method Used (Circle One): Method 9 (circled) / 203A / 203B / Other: ______

Company Name: Andrews AFB

Facility Name: Hospital Incinerator – Bldg. 1055

Street Address:

City: Andrews AFB | State: MD | Zip:

Process: waste incineration | Unit #: | Operating Mode:

Control Equipment: Scrubber | Operating Mode:

Describe Emission Point: Southernmost stack

Height of Emiss. Pt.: Start 30' End same | Height of Emiss. Pt. Rel. to Observer: Start 25' End Same

Distance to Emiss. Pt.: Start 80' End Same | Direction to Emiss. Pt. (Degrees): Start 30°NE End Same

Vertical Angle to Obs. Pt.: Start 20° End Same | Direction to Obs. Pt. (Degrees): Start 45°NE End Same

Distance and Direction to Observation Point from Emission Point: Start 15' E End Same

Describe Emissions: Start none (steam) End Same

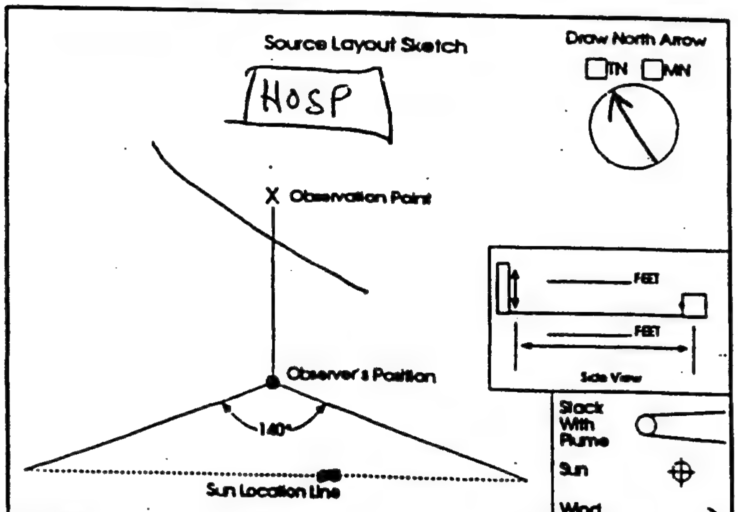
Emission Color: Start —— End Same | Water Droplet Plume: Attached ☒ Detached ☐ None ☐

Describe Plume Background: Start sky End Same

Background Color: Start blue End Same | Sky Conditions: Start p. cloudy End Same

Wind Speed: Start 1-3 End Same | Wind Direction: Start E End Same

Ambient Temp.: Start 11°C End Same | Wet Bulb Temp.: | RH Percent:



Longitude	Latitude	Declination

Additional Information:

Observation Date	Time Zone	Start Time	End Time
2/2/01	EST	1255	1325

Min \ Sec	0	15	30	45	Comments
1	0	0	0	0	
2	0	0	0	0	
3	0	0	0	0	
4	0	0	0	0	
5	0	0	0	0	
6	0	0	0	0	
7	0	0	0	0	
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13	0	0	0	0	
14	0	0	0	0	
15	0	0	0	0	
16	0	0	0	0	
17	0	0	0	0	
18	0	0	0	0	
19	0	0	0	0	
20	0	0	0	0	
21	0	0	0	0	
22	0	0	0	0	
23	0	0	0	0	
24	0	0	0	0	
25	0	0	0	0	
26	0	0	0	0	
27	0	0	0	0	
28	0	0	0	0	
29	0	0	0	0	
30	0	0	0	0	

Observer's Name (Print): Bill Dunstan Jr.

Observer's Signature: William Dunstan Jr. | Date: 2/2/01

Organization: Pacific Environmental Services

Certified By: Eastern Technical Associates | Date: 10/18/00

VEOF1.1

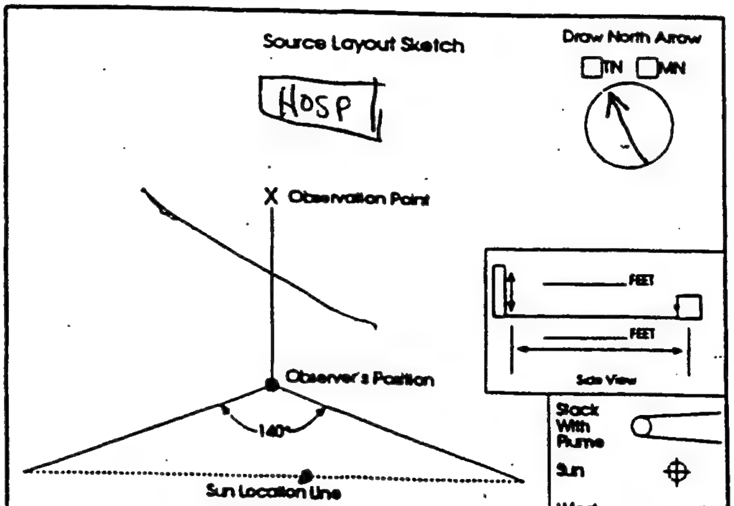
EPA

VISIBLE EMISSION OBSERVATION FORM 1

Method Used (Circle One): Method 9 (circled) | 203A | 203B | Other: ______

Company Name	Andrews AFB
Facility Name	Hospital Incinerator – Bldg. 1055
Street Address	
City	Andrews AFB
State	MD
Zip	
Process	waste incineration
Unit #	
Operating Mode	
Control Equipment	Scrubber
Operating Mode	
Describe Emission Point	southernmost stack
Height of Emiss. Pt.	Start 30' End same
Height of Emiss. Pt. Rel. to Observer	Start 25 End same
Distance to Emiss. Pt.	Start 80' End same
Direction to Emiss. Pt. (Degrees)	Start 30° NE End same
Vertical Angle to Obs. Pt.	Start 20° End same
Direction to Obs. Pt. (Degrees)	Start 45° NE End same
Distance and Direction to Observation Point from Emission Point	Start 15' E End same
Describe Emissions	Start none (steam) End same
Emission Color	Start — End same
Water Droplet Plume	Attached [X] Detached [ ] None [ ]
Describe Plume Background	Start sky End same
Background Color	Start blue End same
Sky Conditions	Start p. cloudy End same
Wind Speed	Start 1-3 End same
Wind Direction	Start E End same
Ambient Temp.	Start 11°C End same
Wet Bulb Temp.	
RH Percent	

Source Layout Sketch



Longitude	Latitude	Declination

Additional Information

VEOF1.1

Form Number	Page	Of

Continued on VEO Form Number

Observation Date	Time Zone	Start Time	End Time
2/2/01	EST	1405	1435

Min \ Sec	0	15	30	45	Comments
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3	0	0	0	0	
4	0	0	0	0	
5	0	0	0	0	
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26	0	0	0	0	
27	0	0	0	0	
28	0	0	0	0	
29	0	0	0	0	
30	0	0	0	0	

Observer's Name (Print)	Bill Dunstan Jr.
Observer's Signature	William Dunstan Jr.
Date	2/2/01
Organization	Pacific Environmental Services
Certified By	Eastern Technical Associates
Date	10/18/00

EPA

VISIBLE EMISSION OBSERVATION FORM 1

Form Number	Page	Of

Continued on VEO Form Number:

Method Used (Circle One): (Method 9) 203A 203B Other: ______

Company Name: Andrews AFB

Facility Name: Hospital Incinerator – Bldg. 1055

Street Address:

City	State	Zip
Andrews AFB	MD	

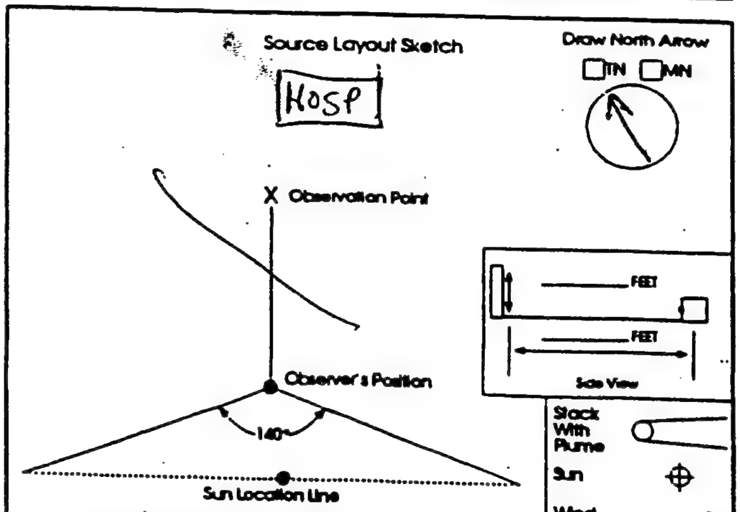
Process	Unit #	Operating Mode
waste incineration		

Control Equipment	Operating Mode
Scrubber	

Describe Emission Point: Southernmost stack

	Start	End
Height of Emiss. Pt.	30′	same
Height of Emiss. Pt. Rel. to Observer	25′	same
Distance to Emiss. Pt.	80′	same
Direction to Emiss. Pt. (Degrees)	30°NE	same
Vertical Angle to Obs. Pt.	20°	same
Direction to Obs. Pt. (Degrees)	45°NE	same
Distance and Direction to Observation Point from Emission Point	15′ E	same
Describe Emissions	none (steam)	same
Emission Color	—	same
Describe Plume Background	sky	same
Background Color	blue	same
Sky Conditions	p. cloudy	same
Wind Speed	1–3	same
Wind Direction	E	same
Ambient Temp.	11°C	same
Wet Bulb Temp.		
RH Percent		

Water Droplet Plume: Attached ☒ Detached ☐ None ☐



Longitude	Latitude	Declination

Additional Information:

VEOF1.1

Observation Date	Time Zone	Start Time	End Time
2/2/01	EST	1435	1505

Min \ Sec	0	15	30	45	Comments
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2	0	0	0	0	
3	0	0	0	0	
4	0	0	0	0	
5	0	0	0	0	
6	0	0	0	0	
7	0	0	0	0	
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26	0	0	0	0	
27	0	0	0	0	
28	0	0	0	0	
29	0	0	0	0	
30	0	0	0	0	

Observer's Name (Print): Bill Dunstan Jr.

Observer's Signature	Date
William Dunstan Jr.	2/2/01

Organization: Pacific Environmental Services

Certified By	Date
Eastern Technical Associates	10/18/00

APPENDIX C

ANALYTICAL DATA

Appendix C.1
Analytical Data
Particulate Matter/Metals (M29)
Hydrogen Chloride (M26)

PACIFIC ENVIRONMENTAL SERVICES, INC.

Central Park West
5001 South Miami Boulevard, P.O. Box 12077
Research Triangle Park, North Carolina 27709-2077
(919) 941-0333 FAX: (919) 941-0234

SAMPLE ANALYSIS FORM FOR FILTERABLE PARTICULATE

Plant: Andrews AFB MD Medical Waste Incinerator   Run ID: M29-1

Sample Location: Incinerator Outlet

Analytical Balance S/P 182 Lab Relative Humidity: 30% Amb. Temp. 75

RINSE CONTAINER ID: M29-1-AR				Rinse Beaker ID:	1		
Lab Added Vol., ml	75			Density of Acetone (ρ_a)	0.7848	g/ml	
Container Final Wt	234.3			Acetone Blank Concent (C_a)	0.00000084	g/g	ok
Container Initial Wt	168.4			Acetone Rinse Volume (V_{aw})	159	ml	
Net Volume Wt., g	65.9			$W_a = C_a V_{aw} \rho_a =$	0.00011	g	0.0001% ok
Weighing Date	2/8/01	Time	1645	Gross Wt	108.8239	g	
Last Weighing Date	2/9/01	Time	0910	Gross Wt	108.8237	g	
				Average of 2 Consecutive Weighings Meeting Criteria	108.8238	g	
Blank Beaker ID	4			- Rinse Beaker Tare Wt	108.8209	g	
Acetone Volume, ml	150.99			- Acetone Blank (Wa)	0.0001	g	
Acetone Residue, g	0.0001			Weight in Acetone Rinse (ma)	0.0028	g	
				= Weight in Acetone Rinse (ma)	2.79	mg	

FILTER SAMPLE ID: M29-1-F				Filter/Container ID:	104-007	
Weighing Date	2/6/01	Time	1700	Gross Wt	34.5242	g
Last Weighing Date	2/7/01	Time	920	Gross Wt	34.5237	g
				Average of 2 Consecutive Weighings Meeting Criteria	34.52395	g
				- Filter & Container Tare Wt	34.5204	g
				= Weight on Filter (mf)	0.00355	g
				= Weight on Filter (mf)	3.55	mg

SUMMARY		
Weight on Filter (m_f)	3.55	mg
+ Weight in Acetone Rinse (ma)	2.79	mg
= Total Particulate (mn)	6.34	mg

v1.0 10/15/00

Signature of Analyst ______________   Signature of Reviewer ______________

PACIFIC ENVIRONMENTAL SERVICES, INC.

Central Park West
5001 South Miami Boulevard, P.O. Box 12077
Research Triangle Park, North Carolina 27709-2077
(919) 941-0333 FAX: (919) 941-0234

SAMPLE ANALYSIS FORM FOR FILTERABLE PARTICULATE

Plant: Andrews AFB MD Medical Waste Incinerator   Run ID: M29-2

Sample Location: Incinerator Outlet

Analytical Balance S/P 182 Lab Relative Humidity: 30% Amb. Temp. 75

RINSE CONTAINER ID: M29-2-AR				Rinse Beaker ID:	2		
Lab Added Vol., ml	75		Density of Acetone (ρ_a)	0.7848	g/ml		
Container Final Wt	252.4		Acetone Blank Concent (C_a)	0.00000084	g/g	ok	
Container Initial Wt	167.9		Acetone Rinse Volume (V_{aw})	182.7	ml		
Net Volume Wt., g	84.5		$W_a = C_a V_{aw} \rho_a =$	0.00012	g	0.0001% ok	
Weighing Date	2/8/01	Time 1645	Gross Wt	101.4551	g		
Last Weighing Date	2/9/01	Time 0910	Gross Wt	101.4551	g		
			Average of 2 Consecutive Weighings Meeting Criteria	101.4551	g		
Blank Beaker ID	4		- Rinse Beaker Tare Wt	101.4507	g		
Acetone Volume, ml	150.99		- Acetone Blank (Wa)	0.0001	g		
Acetone Residue, g	0.0001		Weight in Acetone Rinse (ma)	0.0043	g		
			= Weight in Acetone Rinse (ma)	4.28	mg		

FILTER SAMPLE ID: M29-2-F			Filter/Container ID:	104-003	
Weighing Date	2/6/01	Time 1700	Gross Wt	34.9589	g
Last Weighing Date	2/7/01	Time 920	Gross Wt	34.9585	g
			Average of 2 Consecutive Weighings Meeting Criteria	34.9587	g
			- Filter & Container Tare Wt	34.888	g
			= Weight on Filter (mf)	0.0707	g
			= Weight on Filter (mf)	70.7	mg

SUMMARY		
Weight on Filter (m_f)	70.7	mg
+ Weight in Acetone Rinse (ma)	4.28	mg
= Total Particulate (mn)	75.0	mg

v1.0 10/15/00

Signature of Analyst ____________   Signature of Reviewer ____________

PACIFIC ENVIRONMENTAL SERVICES, INC.

Central Park West
5001 South Miami Boulevard, P.O. Box 12077
Research Triangle Park, North Carolina 27709-2077
(919) 941-0333 FAX: (919) 941-0234

SAMPLE ANALYSIS FORM FOR FILTERABLE PARTICULATE

Plant: Andrews AFB MD Medical Waste Incinerator | Run ID: M29-3

Sample Location: Incinerator Outlet

Analytical Balance S/P 182 | Lab Relative Humidity: 30% | Amb. Temp. 75

RINSE CONTAINER ID: M29-3-AR				Rinse Beaker ID:	3		
Lab Added Vol., ml	75			Density of Acetone (ρ_a)	0.7848	g/ml	
Container Final Wt	219.4			Acetone Blank Concent (C_a)	0.00000084	g/g	ok
Container Initial Wt	167.6			Acetone Rinse Volume (V_{aw})	141	ml	
Net Volume Wt., g	51.8			$W_a = C_a V_{aw} \rho_a =$	0.00009	g	0.0001% ok
Weighing Date	2/8/01	Time	1645	Gross Wt	105.0907	g	
Last Weighing Date	2/9/01	Time	0910	Gross Wt	105.0907	g	
				Average of 2 Consecutive Weighings Meeting Criteria	105.0907	g	
Blank Beaker ID	4			- Rinse Beaker Tare Wt	105.0856	g	
Acetone Volume, ml	150.99			- Acetone Blank (Wa)	0.00009	g	
Acetone Residue, g	0.0001			Weight in Acetone Rinse (ma)	0.00501	g	
				= Weight in Acetone Rinse (ma)	5.01	mg	

FILTER SAMPLE ID: M29-3-F				Filter/Container ID:	104-005	
Weighing Date	2/7/01	Time	0920	Gross Wt	35.1023	g
Last Weighing Date	2/7/01	Time	1705	Gross Wt	35.1024	g
				Average of 2 Consecutive Weighings Meeting Criteria	35.10235	g
				- Filter & Container Tare Wt	35.0363	g
				= Weight on Filter (mf)	0.06605	g
				= Weight on Filter (mf)	66.05	mg

SUMMARY		
Weight on Filter (m_f)	66.05	mg
+ Weight in Acetone Rinse (ma)	5.01	mg
= Total Particulate (mn)	71.06	mg

v1.0 10/15/00

Signature of Analyst ______________ Signature of Reviewer ______________

PACIFIC ENVIRONMENTAL SERVICES, INC.
Central Park West
5001 South Miami Boulevard, P.O. Box 12077
Research Triangle Park, North Carolina 27709-2077
(919) 941-0333 FAX: (919) 941-0234

FINAL WEIGHT DATA SHEET

Project Number: **F181.001** Plant: Andrews AFB Medical Waste Ininerator Item Weighed: Filters

Date	2/6/01	2/6/01	2/7/01	2/7/01		
Time	1100	1700	0920	1705		
Relative Humidity (%):	28%	31%	30	32.5		
Temperature (°F)	78.5	74.5	77.4	75.7		
Standard Weight (g): 49.9998	~~100.0000~~	49.9998	49.9998	50.0000		
Analyst:	MOM	MOM	MOM	MOM		

ID Number	Field Sample ID	WEIGHINGS, g 1st	2nd	3rd	4th	5th	Average of Consecutive Constant Wts
104-007	M29-1	34.5258	34.5242	34.5237			
104-005	M29-3	35.1053	35.1031	35.1023	35.1024		
104-003	M29-2	34.9605	34.9589	34.9585			

PACIFIC ENVIRONMENTAL SERVICES, INC.

Central Park West
5001 South Miami Boulevard, P.O. Box 12077
Research Triangle Park, North Carolina 27709-2077
(919) 941-0333 FAX: (919) 941-0234

Method 5 Tare Weights

Project Number: F181.001

Item Weighed: Beakers

Date:	[redacted]	2/7/01	2/7/01							
Time		0920	1705							
R.H (%)		30	32.5							
Temp (°F)		77.4	75.8							
Std. Wt. (g)		100.0002	100.0004							
Analyst		MDM	MDM							
Lab Sample ID No.	Field Sample ID No.	1st	2nd	3rd	4th	5th	6th	7th	Difference (mg)	Average Filter Tare Weight(s) (mg)
1	~~M~~ M29-1	108.8207	108.8211						0	
2	M29-2	101.4505	101.4508						0	
3	M29-3	105.0854	105.0857						0	
4	B	106.8072	106.8076						0	
5		106.7693	106.7096						0	
6		100.8258	100.8261						0	
7		106.0642	106.6646						0	
8		111.6062	111.6066						0	
									0	
									0	
									0	
									0	
									0	
									0	
									0	
									0	
									0	
									0	
									0	
									0	
									0	

METHOD 5
TARE WEIGHT

Project Number: F181-001 Item Weighed: Filters

Date		01/24/01	1/25/01						
R.H. (%)		28	30						
Temp. (°F)		71.9	71.9						
Std. Wt.		10.0001	10.0001						
Analyst		DDH	DDH						
ID Number	Field Sample Number	1st	2nd	3rd	4th	5th	Final Wt. (g)	Tare Wt. (g)	Difference (mg)
104-001		35.8571	35.8571						
104-002		35.0523	35.0523						
104-003	M29-2	34.8880	34.8880						
104-004		35.5645	35.5645						
104-005	M29-3	35.0363	35.0363						
104-006		36.0069	36.0069						
104-007	M29-1	34.5204	34.5204						
104-008		35.6565	35.6565						

First Analytical Laboratories

ANALYSIS REPORT

Method 29: Multi-Metals
Method 26A: HCl

Project # 104-01-0048

Prepared for:

Pacific Environmental Services, Inc.
5001 South Miami Blvd.
Research Triangle Park, NC 27709

Reviewed and Approved by:

WHWadlin

William H. Wadlin, Ph. D.
Laboratory Manager

February 19, 2001

First Analytical Laboratories

CASE NARRATIVE

Project #: 10204
Client: Pacific Environmental Services
Client Project ID: 101-01-0048

Report Date: 19-Feb-01

Samples:

Four sets of Method 29 Multi-Metals Trains were submitted, one of which was the blank set. The elements of interest were cadmium, lead and mercury. In addition, four samples were submitted for determination of HCl by Method 26A. All of the samples were hand delivered in good condition, with no apparent leakage or damage.

Preparation:

The metals samples were all prepared and analyzed according to EPA Method 29, *Determination of Metals Emissions from Stationary Sources*. The Method 26A samples did not require any sample preparation.

Analysis:

Cadmium and lead were determined by Graphite Furnace Atomic Absorption Spectrophotometry (GFAA). Mercury was determined by Cold Vapor Atomic Absorption Spectrophotometry (CVAA). HCl was determined as chloride by Ion Chromatography with conductivity detection (IC).

Results:

The metals results are presented as total micrograms of element found in the whole analytical fraction listed, for each such fraction specified in the method. The HCl results are given as total milligrams present in the whole original sample. All of the target elements were measurable in all of the runs. The highest levels found were for lead, at about 500 μg per run. The mercury levels found decreased exponentially with run number from about 73 μg to 0.6 μg.

Quality Control:

None of the target elements were found in the blanks. All of the spike recoveries were within the normal range of 75% to 125%. All of the samples were analyzed in duplicate. Whenever the sample levels were at least five times the detection limit, the duplicates agreed within the normal range of 20%.

PACIFIC ENVIRONMENTAL SERVICES, INC.

5001 South Miami Boulevard, P.O. Box 12
Research Triangle Park, North Carolina 27709-2
(919) 941-0333 FAX: (919) 941-0

Chain of Custody Record

Project Num: F181.001

Project Name: Andrews AFB Medical Waste Incinerator

Samplers: DD Holzschuh, J Falank, MD Maret

Date	Time	Field Sample ID	Sample Description	Cd	Pb	Hg					Remarks
2/2/01	0945	M29-1-1	Filter, dry	✓	✓	✓					
2/2/01	0945	M29-1-2	Front Half Acetone Dry-down residue	✓	✓	✓					Beaker No. 1
2/2/01	0945	M29-1-3	0.1 N HNO_3 Front Half rinse	✓	✓	✓					
2/2/01	0945	M29-1-4	Contents of Imps. 1-3 and 0.1 N HNO_3 Rinse	✓	✓	✓					
2/2/01	0945	M29-1-5A	Contents of Imp 4 and 0.1 N HNO_3 Rinse	✓	✓	✓					
2/2/01	0945	M29-1-5B	Contents of Imps. 5-6, $KMnO_4$ and DI Rinses	✓	✓	✓					
2/2/01	0945	M29-1-5C	Imps. 5-6 8N HCl Rinse	✓	✓	✓					
2/2/01	1230	M29-2-1	Filter, dry	✓	✓	✓					
2/2/01	1230	M29-2-2	Front Half Acetone Dry-down residue	✓	✓	✓					Beaker No. 2
2/2/01	1230	M29-2-3	0.1 N HNO_3 Front Half rinse	✓	✓	✓					
2/2/01	1230	M29-2-4	Contents of Imps. 1-3 and 0.1 N HNO_3 Rinse	✓	✓	✓					
2/2/01	1230	M29-2-5A	Contents of Imp 4 and 0.1 N HNO_3 Rinse	✓	✓	✓					
2/2/01	1230	M29-2-5B	Contents of Imps. 5-6, $KMnO_4$ and DI Rinses	✓	✓	✓					
2/2/01	1230	M29-2-5C	Imps. 5-6 8N HCl Rinse	✓	✓	✓					
2/2/01	1405	M29-3-1	Filter, dry	✓	✓	✓					
2/2/01	1405	M29-3-2	Front Half Acetone Dry-down residue	✓	✓	✓					
2/2/01	1405	M29-3-3	0.1 N HNO_3 Front Half rinse	✓	✓	✓					Beaker No. 3
2/2/01	1405	M29-3-4	Contents of Imps. 1-3 and 0.1 N HNO_3 Rinse	✓	✓	✓					
2/2/01	1405	M29-3-5A	Contents of Imp 4 and 0.1 N HNO_3 Rinse	✓	✓	✓					
2/2/01	1405	M29-3-5B	Contents of Imps. 5-6, $KMnO_4$ and DI Rinses	✓	✓	✓					
2/2/01	1405	M29-3-5C	Imps. 5-6 8N HCl Rinse	✓	✓	✓					

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PACIFIC ENVIRONMENTAL SERVICES, INC.

Central Park W
5001 South Miami Boulevard, P.O. Box 12(
Research Triangle Park, North Carolina 27709-2(
(919) 941-0333 FAX: (919) 941-0:

Chain of Custody Record

Project Numb	Project Name
F161.001	Andrews AFB Medical Waste Incinerator

Samplers: DD Holzschuh, J Falank, MD Maret

Date	Time	Field Sample ID	Sample Description	Analysis Requested: CI							Remarks
1/31/01	1045	M26-1	Acid Impinger Contents and Rinses	✓							Run 1
2/1/01	0910	M26-2	Acid Impinger Contents and Rinses	✓							Run 2
2/1/01	0945	M26-3	Acid Impinger Contents and Rinses	✓							Run 3

Relinquished by:	Date/Time	Received by: (Signature)	
	2/12/01		[redacted]

[redacted]

Relinquished by: (Signature)	Date/Time	Received for lab by: (Signature)	REMARKS
	2/12/01	FIRST ANALYTICAL LABS	

Page 1 of 2

First Analytical Laboratories
1126 Burning Tree Dr. Chapel Hill, NC 27514
Tel. (919) 942-8607
FAX (919) 929-8688

ANALYSIS REPORT

Project #: 10204
Client: Pacific Environmental Services
Client Project ID: 104-01-0048

Report Date: 19-Feb-01
Date Received: 12-Feb-01

Total Micrograms in Analytical Fraction

Sample	Cd µg	Pb µg
M29-1 Front	1.86	427
M29-1 Back	1.69	7.1
M29-2 Front	6.22	550
M29-2 Back	0.44	4.4
M29-3 Front	6.09	480
M29-3 Back	0.24	1.2
Blank Front	<0.02	<0.5
Blank Back	<0.03	<0.6

QC SUMMARY

	Cd	Pb
Front Spike, %Recov.	101%	100%
Back Spike, %Recov.	105%	104%

First Analytical Laboratories
1126 Burning Tree Dr. Chapel Hill, NC 27514
Tel. (919) 942-8607
FAX (919) 929-8688

ANALYSIS REPORT

Project #: 10204
Client: Pacific Environmental Services
Client Project ID:

Report Date: 15-Feb-01
Date Received: 12-Feb-01

Total Micrograms Mercury in Analytical Fraction

Sample	Frac1	Frac2B	Frac3A	Frac3B	Frac3C	Total
Blank	<0.40	<0.95	<0.10	<0.12	<0.58	<2.15
M29-1	<0.40	58.8	1.09	3.98	9.17	73.0
M29-2	<0.40	3.85	<0.12	0.56	<1.12	4.41
M29-3	<0.40	<2.28	0.10	0.45	<1.12	0.55

QC SUMMARY

Back Spike, %Recov. 106%

First Analytical Laboratories
1126 Burning Tree Dr. Chapel Hill, NC 27514
Tel. (919) 942-8607
FAX (919) 929-8688

ANALYSIS REPORT

Project #: 10204
Client: Pacific Environmental Services
Client Project ID: 104-01-0048

Report Date: 19-Feb-01
Date Received: 12-Feb-01

Total Milligrams in Sample

	HCl mg
M26A-1	2.8
M26A-~~3~~ 2	0.3
M26A-~~3~~ 3	1.1
Blank	0.8
Spike, % Recovery	116%

CADMIUM

GFAA ANALYSIS RUN SUMMARY AND CALCULATION WORKSHEET

Client: Pacific Environmental Services
Proj. #: 10204
Date: 19-Feb-01

IDL = 0.2 $\mu g/L$
Postdig'n spike conc. = 5.0 $\mu g/L$

Sample ID Client	FAL	Test Sol'n $\mu g/L$	Dig'te Conc $\mu g/L$	FV ml	Dil'n Factor	Total Volume ml	Volume Dig'd ml		Total μg
FRONT HALVES									
Blank	10204.B-1	0.06	0.06	100	1			<	0.02
M29-1	10204.1-1	3.71	18.55	100	5				1.86
M29-2	10204.2-1	6.22	62.20	100	10				6.22
M29-3	10204.3-1	6.09	60.90	100	10				6.09
BACK HALVES									
Blank	10204.B-2A	0.05	0.05	100	1	238	188	<	0.03
M29-1	10204.1-2A	2.86	14.30	100	5	641	541		1.69
M29-1	10204.2-2A	3.74	3.74	100	1	631	531		0.44
M29-3	10204.3-2A	1.97	1.97	100	1	570	470		0.24

FRONT SPIKE	10204.1-1S	8.78	% REC =	101.4%
BACK SPIKE	10204.1-2AS	8.09	% REC =	104.6%

Calibration Data

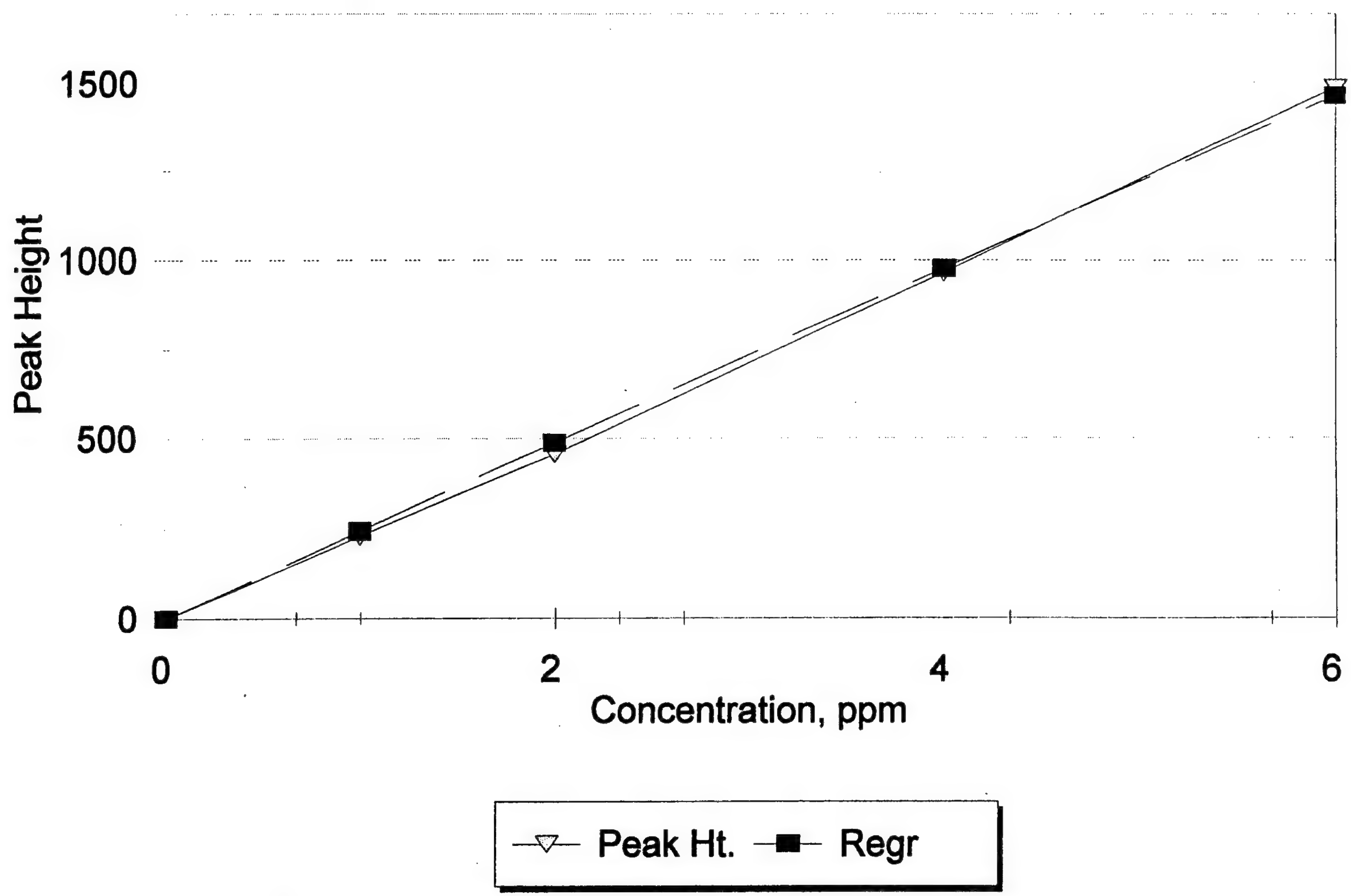
	True conc., $\mu g/L$	Abs.
Blank	0.0	0.000
Standard 1	0.5	0.042
Standard 2	2.0	0.150
Standard 3	5.0	0.361
Standard 4	10.0	0.644

Calibration Verifications

ICV = 5	5.17	CCV2 = 5	5.41
ICB = 0	0.05	CCB2 = 0	0.02
CCV1 = 5	5.35		
CCB1 = 0	0.07		

Chloride Calibration

FAL 10204; 02/13/01



LEAD

GFAA ANALYSIS RUN SUMMARY AND CALCULATION WORKSHEET

Client: Pacific Environmental Services
Proj. #: 10204
Date: 19-Feb-01

IDL = 5 $\mu g/L$
Postdig'n spike conc. = 100 $\mu g/L$

Sample ID Client	FAL	Test Sol'n $\mu g/L$	Dig'te Conc $\mu g/L$	FV ml	Dil'n Factor	Total Volume ml	Volume Dig'd ml		Total μg
FRONT HALVES									
Blank	10204.B-1	3.3	3.3	100	1			<	0.5
M29-1	10204.1-1	106.7	4268.0	100	40				426.8
M29-2	10204.2-1	137.6	5504.0	100	40				550.4
M29-3	10204.3-1	119.9	4796.0	100	40				479.6
BACK HALVES									
Blank	10204.B-2A	0.1	0.1	100	1	238	188	<	0.6
M29-1	10204.1-2A	59.8	59.8	100	1	641	541		7.1
M29-1	10204.2-2A	36.8	36.8	100	1	631	531		4.4
M29-3	10204.3-2A	9.9	9.9	100	1	570	470		1.2

FRONT SPIKE	10204.1-1S	206.9	% REC = 100.2%
BACK SPIKE	10204.1-2AS	164.0	% REC = 104.2%

Calibration Data

	True conc., $\mu g/L$	Abs.
Blank	0.0	0.000
Standard 1	10	0.031
Standard 2	50	0.133
Standard 3	100	0.254
Standard 4	200	0.449

Calibration Verifications

ICV = 100	103.2	CCV2 = 100	106.0
ICB = 0	1.1	CCB2 = 0	1.0
CCV1 = 100	104.5		
CCB1 = 0	0.7		

MERCURY

CVAA ANALYSIS RUN SUMMARY AND CALCULATION WORKSHEET

Client: Pacific Environmental Services
Proj. #: 10204
Date: 14-Feb-01

IDL = 0.2 $\mu g/L$
Postdig'n spike conc. = 5.0 $\mu g/L$

Sample ID Client	FAL	Test Sol'n µg/L	Dig'te Conc µg/L	FV ml	Dil'n Factor	Volume ml	Digst'd Vol. ml		Total µg
FRONT HALVES									
Blank	10204.B-1	-0.13	-0.13	100	1	100	5	<	0.40
M29-1	10204.1-1	-0.10	-0.10	100	1	100	5	<	0.40
M29-2	10204.2-1	-0.02	-0.02	100	1	100	5	<	0.40
M29-3	10204.3-1	0.16	0.16	100	1	100	5	<	0.40
FRACTIONS 2B									
Blank	10204.B-2B	-0.13	-0.13	100	1	238	5	<	0.95
M29-1	10204.1-2B	2.75	2.75	100	1	641	3		58.76
M29-2	10204.2-2B	0.31	0.31	100	1	631	5		3.85
M29-3	10204.3-2B	0.18	0.18	100	1	570	5	<	2.28
BACK SPK	10204.1-2BS	8.05				%REC =	106.0%		
FRACTIONS 3A									
Blank	10204.B-3A	0.11	0.11	100	1	50	10	<	0.10
M29-1	10204.1-3A	1.88	1.88	100	1	58	10		1.09
M29-2	10204.2-3A	0.15	0.15	100	1	59	10	<	0.12
M29-3	10204.3-3A	0.27	0.27	100	1	39	10		0.10
FRACTIONS 3B									
Blank	10204.B-3B	0.07	0.07	100	1	118	20	<	0.12
M29-1	10204.1-3B	1.89	1.89	100	1	421	20		3.98
M29-2	10204.2-3B	0.25	0.25	100	1	446	20		0.56
M29-3	10204.3-3B	0.21	0.21	100	1	432	20		0.45
FRACTIONS 3C									
Blank	10204.B-3C	0.13	0.13	100	1	144	5	<	0.58
M29-1	10204.1-3C	1.62	1.62	100	1	284	5		9.17
M29-2	10204.2-3C	0.17	0.17	100	1	281	5	<	1.12
M29-3	10204.3-3C	0.11	0.11	100	1	279	5	<	1.12

MERCURY

CVAA ANALYSIS RUN SUMMARY AND CALCULATION WORKSHEET

Client: Pacific Environmental Services
Proj. #: 10204
Date: 14-Feb-01

Calibration Data

	Run1 Abs.	Run1 True conc., µg/L
Blank	0.000	0.00
Standard 1	0.007	0.50
Standard 2	0.018	1.00
Standard 3	0.044	2.00
Standard 4	0.107	5.00
Standard 5	0.208	10.00

Calibration Verifications

ICV = 5	5.30	CCV2 = 5	5.13
ICB = 0	-0.15	CCB2 = 0	-0.04
CCV1 = 5	5.40	CCV3 = 5	5.15
CCB1 = 0	-0.21	CCB3 = 0	0.13

Element File: CD.GEL
Date: 02/09/81
Data File: 10204CD.DAT
Technique: HGA

Element: Cd
Time: 08:24
ID/Wt File: 10204.IDW
Calib. Type: Nonlinear

Wavelength: 228.8
Slit: 0.70 L
Lamp Current: 5
Energy: 42

Cd ID: BLANK   Seq. No.: 00001   A/S Pos.: 0   Date: 02/09/8

Replicate 1   Time: 08:24
Peak Area (A-s): -0.001   Peak Height (A): 0.019
Background Pk Area (A-s): 0.007   Background Pk Height (A): 0.014
Blank Corrected Pk Area (A-s): -0.001

Replicate 2   Time: 08:28
Peak Area (A-s): -0.005   Peak Height (A): 0.017
Background Pk Area (A-s): 0.056   Background Pk Height (A): 0.031
Blank Corrected Pk Area (A-s): -0.005

Mean Pk Area (A-s): -0.003   SD: 0.0028   RSD(%): 83.54

Auto-zero performed.

Cd ID: 0.5 PPB CD   Seq. No.: 00002   A/S Pos.: 1   Date: 02/09/8

Replicate 1   Time: 08:31
Peak Area (A-s): 0.038   Peak Height (A): 0.083
Background Pk Area (A-s): 0.081   Background Pk Height (A): 0.040
Blank Corrected Pk Area (A-s): 0.041

Replicate 2   Time: 08:34
Peak Area (A-s): 0.039   Peak Height (A): 0.087
Background Pk Area (A-s): 0.086   Background Pk Height (A): 0.043
Blank Corrected Pk Area (A-s): 0.043

Mean Pk Area (A-s): 0.042   SD: 0.0011   RSD(%): 2.74

Standard number 1 applied. [0.50]
Correlation coefficient: 1.00000   Slope: 0.0839

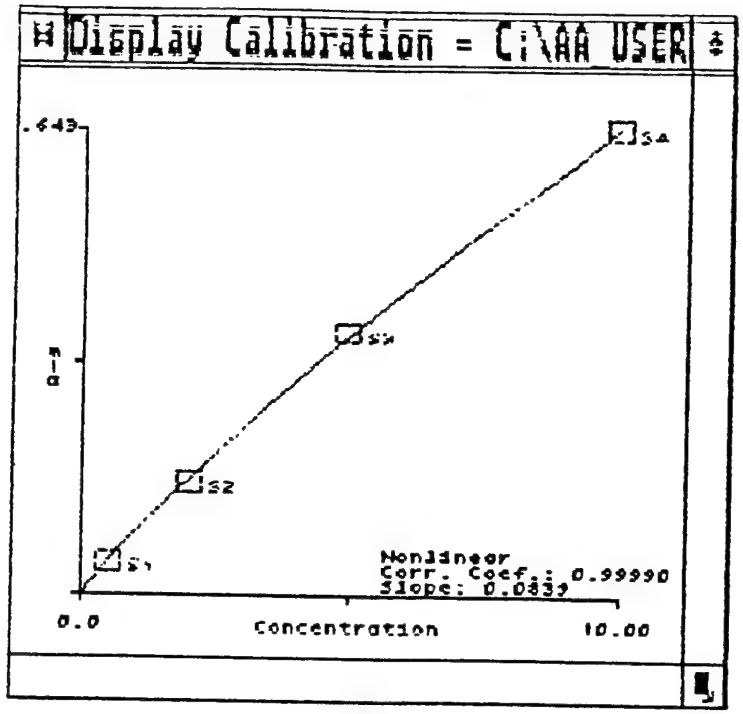
Cd ID: 2 PPB CD   Seq. No.: 00003   A/S Pos.: 2   Date: 02/09/8

Replicate 1   Time: 08:37
Peak Area (A-s): 0.146   Peak Height (A): 0.280
Background Pk Area (A-s): 0.110   Background Pk Height (A): 0.053
Blank Corrected Pk Area (A-s): 0.150
Concentration (ug/L): 1.78

Replicate 2   Time: 08:40
Peak Area (A-s): 0.147   Peak Height (A): 0.297
Background Pk Area (A-s): 0.111   Background Pk Height (A): 0.045
Blank Corrected Pk Area (A-s): 0.150
Concentration (ug/L): 1.79

Mean Conc (ug/L): 1.79   SD: 0.005   RSD(%): 0.30

Standard number 2 applied. [2.00]



OK

Cd ID: ICV Seq. No.: 00006 A/S Pos.: 5 Date: 02/09/

Replicate 1 Time: 08:58
Concentration (ug/L): 5.22

Replicate 2 Time: 09:01
Concentration (ug/L): 5.11

Mean Conc (ug/L): 5.17 SD: 0.084 RSD(%): 1.62

QC sample is within range

Cd ID: ICB Seq. No.: 00007 A/S Pos.: 0 Date: 02/09

Replicate 1 Time: 09:04
Concentration (ug/L): 0.06

Replicate 2 Time: 09:08
Concentration (ug/L): 0.03

Mean Conc (ug/L): 0.05 SD: 0.020 RSD(%): 44.02

QC sample is within range

Cd ID: 10204.B-1 Seq. No.: 00008 A/S Pos.: 6 Date: 02/09

Replicate 1 Time: 09:11
Concentration (ug/L): 0.04

Replicate 2 Time: 09:14

Concentration (ug/L): 0.08

Mean Conc (ug/L): 0.06 SD: 0.029 RSD(%): 45.11

~~~~~~

Cd ID: 10204.1-1 X20 Seq. No.: 00009 A/S Pos.: 7 Date: 02/09/

Replicate 1 Time: 09:17
Concentration (ug/L): 0.97 Corrected Conc (ug/L): 19.4

~~~~~~

Cd ID: 10204.1-1 X5 Seq. No.: 00010 A/S Pos.: 7 Date: 02/09/

Replicate 1 Time: 09:25
Concentration (ug/L): 3.64 Corrected Conc (ug/L): 18.2

Replicate 2 Time: 09:28
Concentration (ug/L): 3.78 Corrected Conc (ug/L): 18.88

Mean Conc (ug/L): 3.71 SD: 0.098 RSD(%): 2.65
Corrected Conc (ug/L): 18.5

~~~~~~

Cd ID: 10204.1-1 X5 Seq. No.: 00011 A/S Pos.: 7 Date: 02/09/

Replicate 1 Time: 09:32
Concentration (ug/L): 8.73 Corrected Conc (ug/L): 43.7

Replicate 2 Time: 09:35
Concentration (ug/L): 8.82 Corrected Conc (ug/L): 44.1

Mean Conc (ug/L): 8.78 SD: 0.062 RSD(%): 0.71
Corrected Conc (ug/L): 43.9

Recovery is 101.4%

~~~~~~

Cd ID: 10204.2-1 X5 Seq. No.: 00012 A/S Pos.: 8 Date: 02/09/

Sample abs. is greater than that of the largest standard.
Replicate 1 Time: 09:38
Concentration (ug/L): 12.08 Corrected Conc (ug/L): 60.4

~~~~~~

Cd ID: 10204.2-1 X10 Seq. No.: 00014 A/S Pos.: 8 Date: 02/09/

Replicate 1 Time: 09:45
Concentration (ug/L): 6.38 Corrected Conc (ug/L): 63.8

Replicate 2 Time: 09:49
Concentration (ug/L): 6.06 Corrected Conc (ug/L): 60.6

Mean Conc (ug/L): 6.22 SD: 0.223 RSD(%): 3.59
Corrected Conc (ug/L): 62.2

~~~~~~

Cd ID: 10204.3-1 X10 Seq. No.: 00015 A/S Pos.: 9 Date: 02/09/

Replicate 1 Time: 09:52
Concentration (ug/L): 6.14 Corrected Conc (ug/L): 61.4

Replicate 2 Time: 09:55
Concentration (ug/L): 6.05 Corrected Conc (ug/L): 60.5

Mean Conc (ug/L): 6.09 SD: 0.061 RSD(%): 1.01
Corrected Conc (ug/L): 60.9

~~~~~~

Cd ID: CCV Seq. No.: 00016 A/S Pos.: 3 Date: 02/09

Replicate 1 Time: 09:59
Concentration (ug/L): 5.30

Replicate 2 Time: 10:02
Concentration (ug/L): 5.39

Mean Conc (ug/L): 5.35 SD: 0.066 RSD(%): 1.23

QC sample is within range

~~~~~~

Cd ID: CCB Seq. No.: 00017 A/S Pos.: 0 Date: 02/09

Replicate 1 Time: 10:05
Concentration (ug/L): 0.04

Replicate 2 Time: 10:08
Concentration (ug/L): 0.09

Mean Conc (ug/L): 0.07 SD: 0.033 RSD(%): 50.2

QC sample is within range

~~~~~~

Cd ID: 10204.B-2A Seq. No.: 00018 A/S Pos.: 10 Date: 02/09/

Replicate 1 Time: 10:11
Concentration (ug/L): -0.07

Replicate 2 Time: 10:15
Concentration (ug/L): 0.16

Mean Conc (ug/L): 0.05 SD: 0.162 RSD(%): 342.5

~~~~~~

Cd ID: 10204.1-2A Seq. No.: 00019 A/S Pos.: 11 Date: 02/09

Sample abs. is greater than that of the largest standard.
Replicate 1 Time: 10:18
Concentration (ug/L): 13.89

~~~~~~

Cd ID: 10204.1-2A X5 Seq. No.: 00020 A/S Pos.: 11 Date: 02/09

Replicate 1 Time: 10:24
Concentration (ug/L): 2.94 Corrected Conc (ug/L): 14.7
~~~~~~

Replicate 2 Time: 10:28
Concentration (ug/L): 2.79 Corrected Conc (ug/L): 13.9

Mean Conc (ug/L): 2.86 SD: 0.109 RSD(%): 3.81
Corrected Conc (ug/L): 14.3

~~~~~~

Cd ID: 10204.1-2A X5 Seq. No.: 00021 A/S Pos.: 11 Date: 02/09/(

Replicate 1 Time: 10:31
Concentration (ug/L): 8.14 Corrected Conc (ug/L): 40.7

Replicate 2 Time: 10:34
Concentration (ug/L): 8.04 Corrected Conc (ug/L): 40.2

Mean Conc (ug/L): 8.09 SD: 0.067 RSD(%): 0.83
Corrected Conc (ug/L): 40.5

Recovery is 104.5%

~~~~~~

Cd ID: 10204.2-2A X5 Seq. No.: 00022 A/S Pos.: 12 Date: 02/09/(

Replicate 1 Time: 10:37
Concentration (ug/L): 0.78 Corrected Conc (ug/L): 3.9

~~~~~~

Cd ID: 10204.2-2A Seq. No.: 00023 A/S Pos.: 12 Date: 02/09/

Replicate 1 Time: 10:41
Concentration (ug/L): 3.62

Replicate 2 Time: 10:45
Concentration (ug/L): 3.86

Mean Conc (ug/L): 3.74 SD: 0.170 RSD(%): 4.54

~~~~~~

Cd ID: 10204.3-2A Seq. No.: 00024 A/S Pos.: 13 Date: 02/09/

Replicate 1 Time: 10:48
Concentration (ug/L): 2.05

Replicate 2 Time: 10:51
Concentration (ug/L): 1.90

Mean Conc (ug/L): 1.97 SD: 0.106 RSD(%): 5.39

~~~~~~

Cd ID: CCV Seq. No.: 00025 A/S Pos.: 3 Date: 02/09/

Replicate 1 Time: 10:54
Concentration (ug/L): 5.43

Replicate 2 Time: 10:57
Concentration (ug/L): 5.39

Mean Conc (ug/L): 5.41 SD: 0.031 RSD(%): 0.57
~~~~~~

QC sample is within range

~~~~~~

Cd ID: CCB Seq. No.: 00026 A/S Pos.: 0 Date: 02/09

Replicate 1 Time: 11:01
Concentration (ug/L): 0.06

Replicate 2 Time: 11:04
Concentration (ug/L): -0.03

Mean Conc (ug/L): 0.02 SD: 0.062 RSD(%): 408.

QC sample is within range
~~~~~~

Element File: PB.GEL
Date: 02/08/81
Data File:
Technique: HGA

Element: Pb
Time: 07:59
ID/Wt File: 20203.IDW
Calib. Type: Nonlinear

Wavelength: 283.3
Slit: 0.70 L
Lamp Current: 10
Energy: 47

Pb ID: BLANK Seq. No.: 00001 A/S Pos.: 0 Date: 02/08/8

Replicate 1
Peak Area (A-s): 0.002
Background Pk Area (A-s): 0.039
Blank Corrected Pk Area (A-s): 0.002

Time: 07:59
Peak Height (A): 0.014
Background Pk Height (A): 0.044

Replicate 2
Peak Area (A-s): 0.000
Background Pk Area (A-s): 0.025
Blank Corrected Pk Area (A-s): 0.000

Time: 08:02
Peak Height (A): 0.016
Background Pk Height (A): 0.032

Mean Pk Area (A-s): 0.001 SD: 0.0010 RSD(%): 88.39

Auto-zero performed.

Pb ID: 10 PPB PB Seq. No.: 00002 A/S Pos.: 1 Date: 02/08/8

Replicate 1
Peak Area (A-s): 0.033
Background Pk Area (A-s): 0.058
Blank Corrected Pk Area (A-s): 0.031

Time: 08:06
Peak Height (A): 0.064
Background Pk Height (A): 0.122

Replicate 2
Peak Area (A-s): 0.032
Background Pk Area (A-s): 0.027
Blank Corrected Pk Area (A-s): 0.031

Time: 08:09
Peak Height (A): 0.083
Background Pk Height (A): 0.039

Mean Pk Area (A-s): 0.031 SD: 0.0002 RSD(%): 0.52

Standard number 1 applied. [10.0]
Correlation coefficient: 1.00000 Slope: 0.0031

Pb ID: 50 PPB PB Seq. No.: 00003 A/S Pos.: 2 Date: 02/08/

Replicate 1
Peak Area (A-s): 0.134
Background Pk Area (A-s): 0.050
Blank Corrected Pk Area (A-s): 0.133
Concentration (ug/L): 42.4

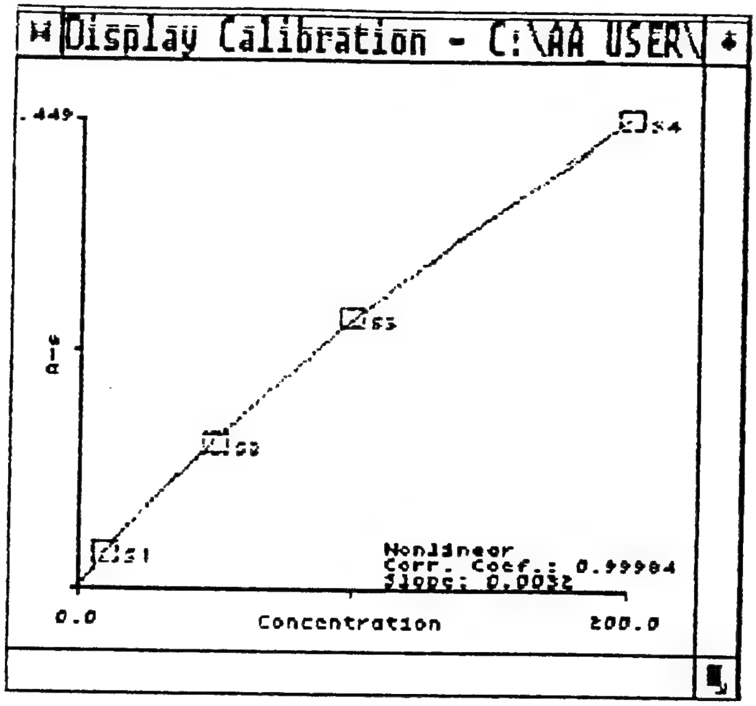
Time: 08:12
Peak Height (A): 0.333
Background Pk Height (A): 0.071

Replicate 2
Peak Area (A-s): 0.133
Background Pk Area (A-s): 0.050
Blank Corrected Pk Area (A-s): 0.132
Concentration (ug/L): 42.3

Time: 08:16
Peak Height (A): 0.329
Background Pk Height (A): 0.072

Mean Conc (ug/L): 42.3 SD: 0.03 RSD(%): 0.08

Standard number 2 applied. [50.0]



OK

~~~~~~

Pb ID: ICV Seq. No.: 00008 A/S Pos.: 5 Date: 02/08/(

Replicate 1 Time: 08:45
Concentration (ug/L): 99.7

Replicate 2 Time: 08:48
Concentration (ug/L): 106.7

Mean Conc (ug/L): 103.2 SD: 4.93 RSD(%): 4.77

QC sample is within range 79.5 - 120.49

~~~~~~

Pb ID: ICB Seq. No.: 00009 A/S Pos.: 0 Date: 02/0E (

Replicate 1 Time: 08:52
Concentration (ug/L): 1.7

Replicate 2 Time: 08:55
Concentration (ug/L): 0.5

Mean Conc (ug/L): 1.1 SD: 0.83 RSD(%): 74.89

QC sample is within range -5.49 - 5.49

~~~~~~

Pb ID: ~~2~~0203.LB1 Seq. No.: 00010 A/S Pos.: 6 Date: 02/0E (
1 ALL ↓

Replicate 1 Time: 08:58
Concentration (ug/L): 1.1

Replicate 2 Time: 09:02
Concentration (ug/L): 1.1
~~~~~~

Concentration (ug/L): 144.8

Replicate 2 Time: 14:57
Concentration (ug/L): 144.1

Mean Conc (ug/L): 144.5 SD: 0.48 RSD(%): 0.33

~~~~~~

Pb ID: 20203.30-3 Seq. No.: 00064 A/S Pos.: 26 Date: 02/08/8

Replicate 1 Time: 15:01
Concentration (ug/L): 142.4

Replicate 2 Time: 15:04
Concentration (ug/L): 143.5

Mean Conc (ug/L): 143.0 SD: 0.77 RSD(%): 0.54

~~~~~~

Pb ID: 20203.30-4 Seq. No.: 00065 A/S Pos.: 27 Date: 02/08/8

Replicate 1 Time: 15:07
Concentration (ug/L): 153.3

Replicate 2 Time: 15:11
Concentration (ug/L): 152.1

Mean Conc (ug/L): 152.7 SD: 0.84 RSD(%): 0.55

~~~~~~

Pb ID: 20203.30-6 Seq. No.: 00066 A/S Pos.: 28 Date: 02/08/8

Replicate 1 Time: 15:14
Concentration (ug/L): 137.5

Replicate 2 Time: 15:17
Concentration (ug/L): 136.8

Mean Conc (ug/L): 137.2 SD: 0.50 RSD(%): 0.37

~~~~~~

Pb ID: 20203.30-7 Seq. No.: 00067 A/S Pos.: 29 Date: 02/08/8

Replicate 1 Time: 15:21
Concentration (ug/L): 3.0

Replicate 2 Time: 15:24
Concentration (ug/L): 1.3

Mean Conc (ug/L): 2.1 SD: 1.19 RSD(%): 56.46

~~~~~~

Pb ID: CCV Seq. No.: 00068 A/S Pos.: 3 Date: 02/08/8

Replicate 1 Time: 15:27
Concentration (ug/L): 104.3

Replicate 2 Time: 15:31
Concentration (ug/L): 104.8
~~~~~~

Mean Conc (ug/L): 104.5 SD: 0.34 RSD(%): 0.33

QC sample is within range 79.5 - 120.49

~~~~~~

Pb ID: CCB Seq. No.: 00069 A/S Pos.: 0 Date: 02/08/8

Replicate 1 Time: 15:34
Concentration (ug/L): 1.2

Replicate 2 Time: 15:38
Concentration (ug/L): 0.3

Mean Conc (ug/L): 0.7 SD: 0.65 RSD(%): 90.37

QC sample is within range -5.49 - 5.49

~~~~~~

Pb ID: 10204.B-1 Seq. No.: 00070 A/S Pos.: 6 Date: 02/08.

Replicate 1 Time: 15:44
Concentration (ug/L): 3.1

Replicate 2 Time: 15:48
Concentration (ug/L): 3.4

Mean Conc (ug/L): 3.3 SD: 0.22 RSD(%): 6.64

~~~~~~

Pb ID: 10204.1-1 X20 Seq. No.: 00071 A/S Pos.: 7 Date: 02/08/8

Replicate 1 Time: 15:51
Concentration (ug/L): 204.6 Corrected Conc (ug/L): 4092.

~~~~~~

Pb ID: 10204.1-1 X40 Seq. No.: 00072 A/S Pos.: 7 Date: 02/08/8

Replicate 1 Time: 15:57
Concentration (ug/L): 108.1 Corrected Conc (ug/L): 4322.

Replicate 2 Time: 16:00
Concentration (ug/L): 105.4 Corrected Conc (ug/L): 4216.

Mean Conc (ug/L): 106.7 SD: 1.88 RSD(%): 1.76
Corrected Conc (ug/L): 4269.

~~~~~~

Pb ID: 10204.1-1 X40 Seq. No.: 00073 A/S Pos.: 7 Date: 02/08/8

Replicate 1 Time: 16:04
Concentration (ug/L): 209.8 Corrected Conc (ug/L): 8390.

Replicate 2 Time: 16:07
Concentration (ug/L): 204.1 Corrected Conc (ug/L): 8164.

Mean Conc (ug/L): 206.9 SD: 3.99 RSD(%): 1.93
Corrected Conc (ug/L): 8277.

Recovery is 100.2%
~~~~~~

~~~~~~

Pb ID: 10204.2-1 X40 Seq. No.: 00074 A/S Pos.: 8 Date: 02/08/8

Replicate 1 Time: 16:11
Concentration (ug/L): 138.2 Corrected Conc (ug/L): 5529.

Replicate 2 Time: 16:14
Concentration (ug/L): 137.0 Corrected Conc (ug/L): 5480.

Mean Conc (ug/L): 137.6 SD: 0.86 RSD(%): 0.63
Corrected Conc (ug/L): 5505.

~~~~~~

Pb ID: 10204.3-1 X40 Seq. No.: 00075 A/S Pos.: 9 Date: 02/08/8

Replicate 1 Time: 16:17
Concentration (ug/L): 121.6 Corrected Conc (ug/L): 4863.

Replicate 2 Time: 16:21
Concentration (ug/L): 118.3 Corrected Conc (ug/L): 4731.

Mean Conc (ug/L): 119.9 SD: 2.34 RSD(%): 1.95
Corrected Conc (ug/L): 4797.

~~~~~~

Pb ID: 10204.B-2A Seq. No.: 00076 A/S Pos.: 10 Date: 02/08/8

Replicate 1 Time: 16:24
Concentration (ug/L): 0.7

Replicate 2 Time: 16:27
Concentration (ug/L): -0.4

Mean Conc (ug/L): 0.1 SD: 0.77 RSD(%): 595.48

~~~~~~

Pb ID: 10204.1-2A Seq. No.: 00077 A/S Pos.: 11 Date: 02/08/8

Replicate 1 Time: 16:31
Concentration (ug/L): 59.2

Replicate 2 Time: 16:34
Concentration (ug/L): 60.3

Mean Conc (ug/L): 59.8 SD: 0.82 RSD(%): 1.38

~~~~~~

Pb ID: 10204.1-2A Seq. No.: 00078 A/S Pos.: 11 Date: 02/08/8

Replicate 1 Time: 16:38
Concentration (ug/L): 165.0

Replicate 2 Time: 16:41
Concentration (ug/L): 163.0

Mean Conc (ug/L): 164.0 SD: 1.45 RSD(%): 0.88

Recovery is 104.3%
~~~~~~

~~~~~~

Pb ID: 10204.2-2A Seq. No.: 00079 A/S Pos.: 12 Date: 02/08/8

Replicate 1 Time: 16:44
Concentration (ug/L): 37.5

Replicate 2 Time: 16:48
Concentration (ug/L): 36.0

Mean Conc (ug/L): 36.8 SD: 1.08 RSD(%): 2.94

~~~~~~

Pb ID: 10204.3-2A Seq. No.: 00080 A/S Pos.: 13 Date: 02/08/8

Replicate 1 Time: 16:51
Concentration (ug/L): 10.4

Replicate 2 Time: 16:54
Concentration (ug/L): 9.4

Mean Conc (ug/L): 9.9 SD: 0.69 RSD(%): 6.99

~~~~~~

Pb ID: CCV Seq. No.: 00081 A/S Pos.: 3 Date: 02/08/8

Replicate 1 Time: 16:58
Concentration (ug/L): 105.2

Replicate 2 Time: 17:01
Concentration (ug/L): 106.7

Mean Conc (ug/L): 106.0 SD: 1.05 RSD(%): 0.99

QC sample is within range 79.5 - 120.49

~~~~~~

Pb ID: CCB Seq. No.: 00082 A/S Pos.: 0 Date: 02/08/8

Replicate 1 Time: 17:04
Concentration (ug/L): 1.9

Replicate 2 Time: 17:08
Concentration (ug/L): 0.2

Mean Conc (ug/L): 1.0 SD: 1.24 RSD(%): 119. C

QC sample is within range -5.49 - 5.49

===

HG AA-BG BG
MAIN: 0.004 PA-0.011 -0.220
PH 0.004 -0.001

===

0.000 AUTOZERO

===

HG AA-BG BG
MAIN: 0.007 PA 0.200 0.191
PH 0.007 0.003

===

0.50 1.STANDARD

===

HG AA-BG BG
MAIN: 1.32 UG/L PA 0.435 0.188
PH 0.018 0.002

===

E61 Sample concentration greater than highest standard

===

1.04 2.STANDARD

===

HG AA-BG BG
MAIN: 2.54 UG/L PA 0.961 0.190
PH 0.044 0.002

===

E61 Sample concentration greater than highest standard

===

2.09 3.STANDARD

===

HG AA-BG BG
MAIN: 5.09 UG/L PA 2.214 0.173
PH 0.107 0.001

===

E61 Sample concentration greater than highest standard

===

5.01 4.STANDARD

===

HG AA-BG BG
MAIN: 9.75 UG/L PA 4.273 0.232
PH 0.208 0.004

===

E61 Sample concentration greater than highest standard

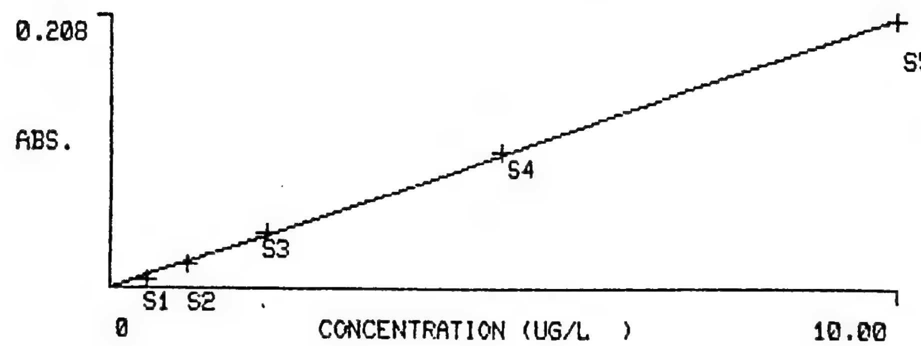
===

9.94 5.STANDARD

HGA DISPLAY CALIBRATION MODE
ELEMENT: HG - PEAK HEIGHT

PRINTER: ON
BG CORR: ON
UNITS : UG/L
CH.MASS:

9.94



READ
PEAK AREA (A-S)
AA-BG: 4.273
BG: 0.232

PEAK HEIGHT (A)
AA-BG: 0.208
BG: 0.004

Note	HG	MAIN		AA-BG	BG	HG	MAIN		AA-BG	BG
	ICV	5.30 UG/L	PA	2.157	0.244	ICB	-0.15 UG/L	PA	-0.021	0.208
			PH	0.111	0.004			PH	-0.003	0.002
5 ml	B-2B	-0.13 UG/L	PA	-0.015	0.183		-0.13 UG/L	PA	0.003	0.217
			PH	-0.003	0.000			PH	-0.003	0.002
3 ml	1-2B	2.73 UG/L	PA	1.150	0.241		2.77 UG/L	PA	1.217	0.235
			PH	0.057	0.004			PH	0.058	0.003
"	1-2BS	8.01 UG/L	PA	3.245	0.243		8.09 UG/L	PA	3.301	0.223
			PH	0.168	0.003			PH	0.170	0.004
5 ml	2-2B	0.38 UG/L	PA	0.165	0.152		0.23 UG/L	PA	0.161	0.226
			PH	0.008	0.000			PH	0.005	0.003
	3-2B	0.21 UG/L	PA	0.143	0.238		0.15 UG/L	PA	0.141	0.176
			PH	0.004	0.003			PH	0.003	0.001
	B-1	-0.13 UG/L	PA	-0.026	0.244		-0.13 UG/L	PA	0.010	0.215
			PH	-0.003	0.003			PH	-0.003	0.002
	1-1	-0.10 UG/L	PA	0.022	0.239		-0.10 UG/L	PA	0.020	0.239
			PH	-0.002	0.003			PH	-0.002	0.003
	2-1	-0.10 UG/L	PA	-0.009	0.260	CCV	5.40 UG/L	PA	2.297	0.222
			PH	-0.002	0.004			PH	0.113	0.002
	CCB	-0.21 UG/L	PA	-0.035	0.148					
			PH	-0.004	0.002					

0.00 AUTOZERO

	HG	MAIN (UG/L)		AA-BG	BG	HG	MAIN (UG/L)		AA-BG	BG
5 ml	2-1	0.06	PA	0.042	0.101	3-1	0.21	PA	0.114	0.058
			PH	0.001	0.002			PH	0.004	-0.000
11	3-1	0.11	PA	0.080	0.070					
			PH	0.002	0.001					
10 ml	B-3A	0.11	PA	0.042	0.083		0.10	PA	0.029	-0.038
			PH	0.002	0.003			PH	0.002	-0.002
	1-3A	1.85	PA	0.746	0.114		1.91	PA	0.802	0.107
			PH	0.039	0.002			PH	0.040	0.000
	2-3A	0.15	PA	0.052	0.101		0.15	PA	0.076	0.102
			PH	0.003	0.000			PH	0.003	0.000
	3-3A	0.19	PA	0.094	0.090		0.34	PA	0.114	0.014
			PH	0.004	-0.000			PH	0.007	0.000
20 ml	B-3B	0.02	PA	0.034	0.088		0.11	PA	0.036	0.089
			PH	0.000	-0.000			PH	0.002	0.000
	1-3B	1.95	PA	0.773	0.073		1.83	PA	0.742	0.136
			PH	0.041	0.002			PH	0.038	0.002
	CCV	5.13	PA	2.166	-0.056	CCB	-0.04	PA	-0.004	0.016
			PH	0.108	0.006			PH	-0.001	0.004
	2-3B	0.29	PA	0.122	-0.208		0.21	PA	0.115	-0.092
			PH	0.006	-0.000			PH	0.004	0.003
	3-3B	0.23	PA	0.106	-0.254		0.19	PA	0.077	-0.220
			PH	0.005	0.003			PH	0.004	-0.000
5 ml	B-3c	0.06	PA	0.022	-0.648		0.19	PA	0.058	-0.106
			PH	0.001	-0.001			PH	0.004	0.024
	1-3C	1.55	PA	0.682	-0.195		1.68	PA	0.687	-0.359
			PH	0.032	-0.001			PH	0.035	0.016
	2-3C	0.17	PA	0.084	-0.488		0.17	PA	0.074	0.011
			PH	0.004	0.012			PH	0.004	0.003
	3-3C	0.13	PA	0.041	-0.265		0.08	PA	0.019	0.004
			PH	0.003	0.013			PH	0.002	0.000

HG	CCV	AA--BG	BG	HG	CCB		AA-BG	BG
MAIN:	5.15 UG/L	PA 2.200	0.026	MAIN:	0.13 UG/L	PA	0.054	0.056
		PH 0.108	0.003			PH	0.003	0.000

Appendix C.2
Analytical Data
Dioxins/Furans (M23)

ALTA ANALYTICAL PERSPECTIVES

25 FEB 2001

Michael Maret
PES
5001 South Miami Blvd
Research Triangle Park, NC 27703

Ph.: 919-941-0333
Fax: 919-941-0234

Dear Mike;

Attached to this narrative are the analytical results you requested on samples submitted for the determination of polychlorinated dibenzo-*p*-dioxins and dibenzofurans. The insert below summarizes the relevant information pertaining to your project. In particular, the QC annotations bring to your attention specific analytical observations and assessments made during the sample handling and data interpretation phases. A brief description of the report's components is provided on the next page.

Your Project No.:	**F181.001**
AAP Project No.:	**P1388**
Analytical Protocol:	**Method 23**
No. of Samples Submitted:	**4 (RB on hold)**
No. of Samples Analyzed:	**3**
No. of Lab Method Blanks (MB):	**1**
No. of OPRs:	**1**

QC Annotations:

1. The data meet QA/QC requirements.
2. An "A" data qualifier is used for analytes with a concentration falling below the calibration curve.
3. Sample "M23-1" required additional cleanup to produce data of acceptable quality.

Alta Analytical Perspectives remains committed to serving you in the most effective manner. Should you have any questions or need additional information and technical support, please, do not hesitate to contact us at the telephone numbers shown below. We wanted to thank you for choosing Alta Analytical Perspectives as part of your analytical support team.

Sincerely,

Yves Tondeur, Ph.D.

2714 Exchange Drive
Wilmington
North Carolina 28405
Tel.: 910-794-1613 Fax: 910-794-3919

P1388

ALTA ANALYTICAL PERSPECTIVES

Part 1
Narrative

- ☑ Letter
- ☑ QC Annotations
- ☑ Project Information

ALTA ANALYTICAL PERSPECTIVES

Part 2
Path

- ☑ Overview
- ☑ Protocol
- ☑ Extraction
- ☑ Analysis
- ☑ Spike Profile
- ☑ SOPs
- ☑ QC
- ☑ Reporting
- ☑ Special Requirements

ALTA ANALYTICAL PERSPECTIVES

Part 3
Results

- ☑ Summary Topsheets
- ☑ Raw Data
- ☑ SICPs
- ☑ Areas
- ☑ Retention Times
- ☑ S/N
- ☑ Ion Abundance Ratios

ALTA ANALYTICAL PERSPECTIVES

Part 4
Performance

- ☑ System Checks
- ☑ Mass Spectrometry
- ☑ Gas Chromatography
- ☑ Initial Calibration
- ☑ Continuing Calibration
- ☑ OPR

Extraction
Tracking Sheets

Fractionation
Tracking Sheets

Injection
Tracking Sheets

Part 4
GC, MS,
ConCal

Part 4D
ICal

Part 4E
OPR

REPORTING PLATFORMS

LEVEL I:
① PART 1
② SUMMARY TOPSHEETS
③ COC

LEVEL II:
① PARTS 1, 2, 3, 4
② WITH ICAL SUMMARY

LEVEL III:
① PARTS 1, 2, 3, 4
② WITH COMPLETE RAW DATA FOR ICAL

PLATINUM:
① PARTS 1, 2, 3, 4
② WITH COMPLETE RAW DATA FOR ICAL
③ ON-GOING PRECISION & ACCURACY DATA

Sample Summary

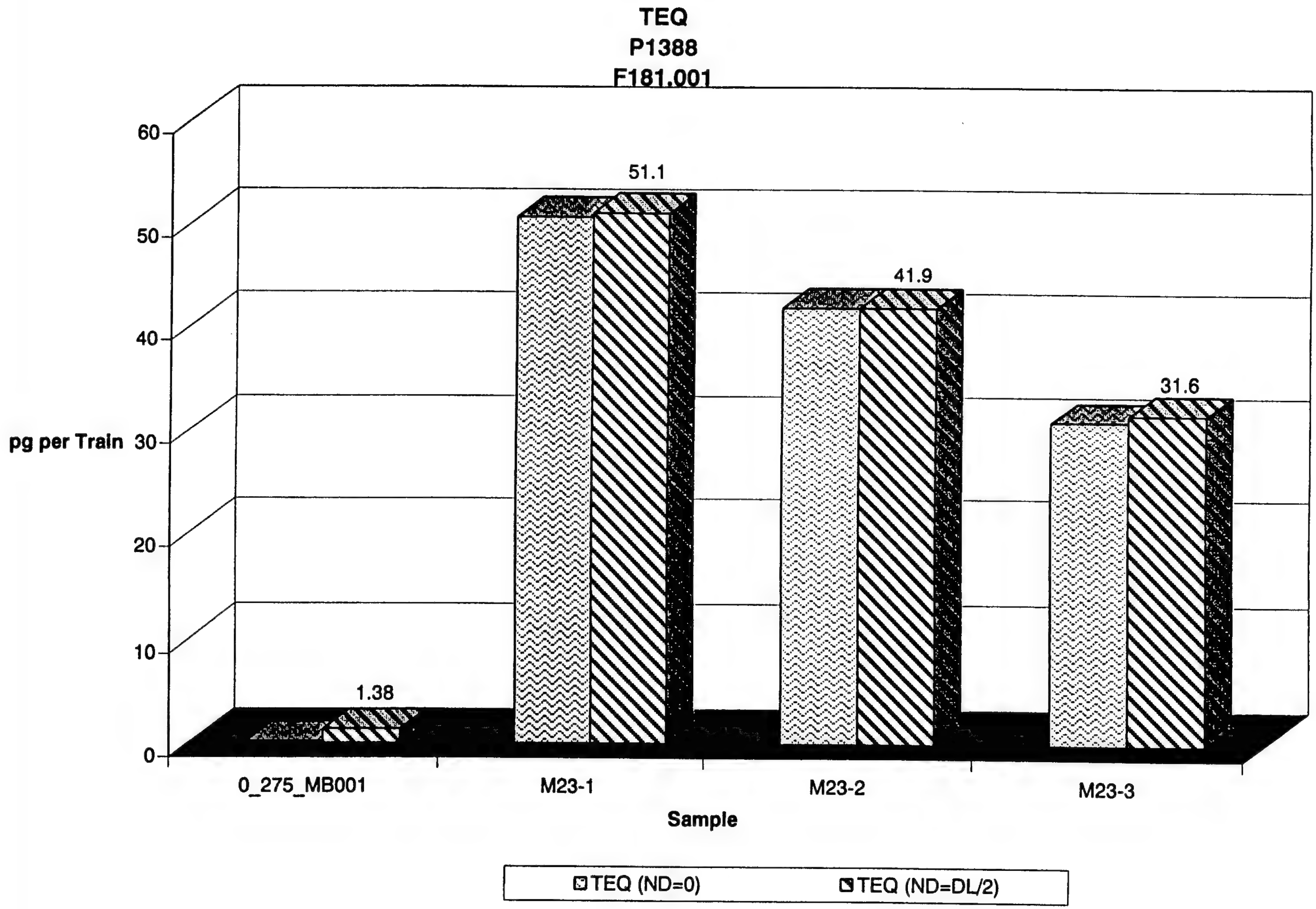
ALTA ANALYTICAL PERSPECTIVES

Method M23

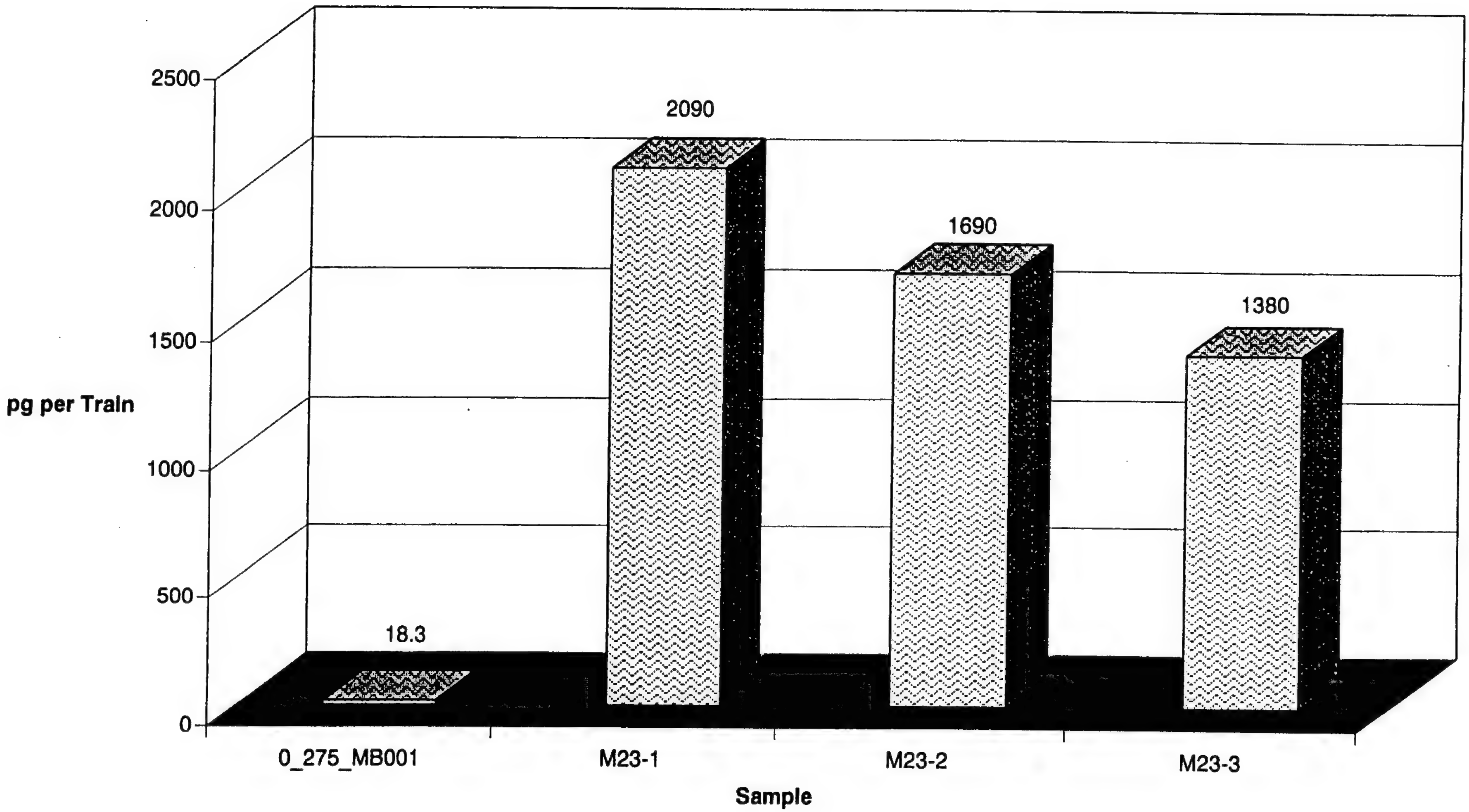
Analyte	0_275_MB001	M23-1	M23-2	M23-3
	pg	pg	pg	pg
2,3,7,8-TCDD	[1.29]	(0.792)	0.945	(0.58)
1,2,3,7,8-PeCDD	(0.997)	[1.74]	2.44	(1.63)
1,2,3,4,7,8-HxCDD	(1.68)	4.56	[1.96]	2.54
1,2,3,6,7,8-HxCDD	(1.87)	7.58	[5.04]	4.63
1,2,3,7,8,9-HxCDD	(1.68)	4.64	2.76	[2.25]
1,2,3,4,6,7,8-HpCDD	[1.9]	27.3	21.5	20.5
OCDD	12.9	74.4	57.1	63.3
2,3,7,8-TCDF	(1.27)	11.3	8.77	7.39
1,2,3,7,8-PeCDF	(1.84)	20.9	15.2	11.6
2,3,4,7,8-PeCDF	(1.81)	46.6	36.1	26.5
1,2,3,4,7,8-HxCDF	1.69	48.9	40	28.9
1,2,3,6,7,8-HxCDF	(0.552)	54.6	45.7	35.5
2,3,4,6,7,8-HxCDF	(0.586)	87.3	73.7	60.2
1,2,3,7,8,9-HxCDF	(0.67)	13.7	11.1	8.99
1,2,3,4,6,7,8-HpCDF	1.86	234	208	172
1,2,3,4,7,8,9-HpCDF	(2.03)	26.5	22.2	18.8
OCDF	(2.83)	145	118	113
Totals & TEQs				
TCDDs	ND	17.3	13	3.93
PeCDDs	ND	41.3	31.3	18.8
HxCDDs	ND	68.2	42.9	38.9
HpCDDs	1.83	55.6	44.4	41.5
TCDFs	ND	345	265	205
PeCDFs	ND	451	354	277
HxCDFs	1.69	517	441	345
HpCDFs	1.86	370	328	274
Total PCDD/Fs	**18.3**	**2090**	**1690**	**1380**
TEQ (ND=0)	**0.200**	**50.7**	**41.9**	**30.9**
TEQ (ND=DL/2)	**1.38**	**51.1**	**41.9**	**31.6**

( ) = DL
[ ] = EMPC

Reviewer CL
Date 25 Feb 01


TEQ
P1388
F181.001
pg per Train
60
50
40
30
20
10
0
1.38
51.1
41.9
31.6
0_275_MB001
M23-1
M23-2
M23-3
Sample
TEQ (ND=0)
TEQ (ND=DL/2)

Total PCDD/Fs
P1388
F181.001



Sample ID: 0_275_MB001 — Method M23

Client Data		**Sample Data**		**Laboratory Data**			
Name:	PES	Matrix:	Air	Project No.:	P1388	Date Received:	n/a
Project ID:	F181.001	Weight/Volume:	1	Sample ID:	0_275_MB001	Date Extracted:	8-Feb-01
Date Collected:	n/a			QC Batch No.:	275	Date Analyzed:	14-FEB-01

Analyte	Conc.	DL	EMPC	Qualifier	Recoveries		
	pg	pg	pg		IS	SS	AS
2,3,7,8-TCDD	EMPC		1.29	A	99.6	98.2	85.4
1,2,3,7,8-PeCDD	ND	0.997			100	96.4	85.4
1,2,3,4,7,8-HxCDD	ND	1.68			100	97.1	85.4
1,2,3,6,7,8-HxCDD	ND	1.87			100	97.1	85.4
1,2,3,7,8,9-HxCDD	ND	1.68			100	97.1	85.4
1,2,3,4,6,7,8-HpCDD	EMPC		1.9	A	100	99.1	85.4
OCDD	12.9			A	95.7	99.1	85.4
2,3,7,8-TCDF	ND	1.27			100	98.2	85.4
1,2,3,7,8-PeCDF	ND	1.84			93.6	96.4	85.4
2,3,4,7,8-PeCDF	ND	1.81			93.6	96.4	85.4
1,2,3,4,7,8-HxCDF	1.69			A	86.5	97.3	85.4
1,2,3,6,7,8-HxCDF	ND	0.552			86.5	97.3	85.4
2,3,4,6,7,8-HxCDF	ND	0.586			86.5	97.3	85.4
1,2,3,7,8,9-HxCDF	ND	0.67			86.5	97.3	85.4
1,2,3,4,6,7,8-HpCDF	1.86			A	88	99.1	85.4
1,2,3,4,7,8,9-HpCDF	ND	2.03			88	99.1	85.4
OCDF	ND	2.83			91	99.1	85.4

Totals & TEQs				
TCDDs	ND		1.29	
PeCDDs	ND	0.997		
HxCDDs	ND	1.74		
HpCDDs	1.83		3.73	
TCDFs	ND	1.27		
PeCDFs	ND	1.83		
HxCDFs	1.69			
HpCDFs	1.86			
Total PCDD/Fs	**18.3**		**21.5**	
TEQ (ND=0)	**0.200**		**1.5**	**ITEF**
TEQ (ND=DL/2)	**1.38**		**2.68**	**ITEF**

ALTA ANALYTICAL PERSPECTIVES
2714 Exchange Drive
Wilmington
North Carolina 28405
USA

Tel: 910 794-1613
Fax: 910 794-3919
e-mail: ytondeur@cs.com
web: www.ultratrace.com

Reviewer Ce
Date 25 Feb Ø1

Sample ID: M23-1

Method M23

Client Data		Sample Data		Laboratory Data			
Name:	PES	Matrix:	Air	Project No.:	P1388	Date Received:	6-Feb-01
Project ID:	F181.001	Weight/Volume:	1	Sample ID:	P1388_275_001CU	Date Extracted:	8-Feb-01
Date Collected:	31-Jan-01			QC Batch No.:	275	Date Analyzed:	23-FEB-01

Analyte	Conc.	DL	EMPC	Qualifier	Recoveries		
	pg	pg	pg		IS	SS	AS
2,3,7,8-TCDD	ND	0.792			102	96.5	97.9
1,2,3,7,8-PeCDD	EMPC		1.74	A	99.7	93.1	97.9
1,2,3,4,7,8-HxCDD	4.56			A	104	91.1	97.9
1,2,3,6,7,8-HxCDD	7.58			A	104	91.1	97.9
1,2,3,7,8,9-HxCDD	4.64			A	104	91.1	97.9
1,2,3,4,6,7,8-HpCDD	27.3			A B	96.5	90.3	97.9
OCDD	74.4			A B	83.6	90.3	97.9
2,3,7,8-TCDF	11.3				100	96.5	97.9
1,2,3,7,8-PeCDF	20.9			A	91.1	93.1	97.9
2,3,4,7,8-PeCDF	46.6			A	91.1	93.1	97.9
1,2,3,4,7,8-HxCDF	48.9			A B	90.7	96.9	97.9
1,2,3,6,7,8-HxCDF	54.6				90.7	96.9	97.9
2,3,4,6,7,8-HxCDF	87.3				90.7	96.9	97.9
1,2,3,7,8,9-HxCDF	13.7			A	90.7	96.9	97.9
1,2,3,4,6,7,8-HpCDF	234			B	86	90.3	97.9
1,2,3,4,7,8,9-HpCDF	26.5			A	86	90.3	97.9
OCDF	145				81.3	90.3	97.9
Totals & TEQs							
TCDDs	17.3						
PeCDDs	41.3		48.5				
HxCDDs	68.2						
HpCDDs	55.6						
TCDFs	345		370				
PeCDFs	451		456				
HxCDFs	517						
HpCDFs	370						
Total PCDD/Fs	**2090**		**2120**				
TEQ (ND=0)	**50.7**		**51.5**	**ITEF**			
TEQ (ND=DL/2)	**51.1**		**51.9**	**ITEF**			

ALTA ANALYTICAL PERSPECTIVES

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Reviewer a

Date 25 Feb 01

Sample ID: M23-2 — Method M23

Client Data		Sample Data		Laboratory Data			
Name:	PES	Matrix:	Air	Project No.:	P1388	Date Received:	6-Feb-01
Project ID:	F181.001	Weight/Volume:	1	Sample ID:	P1388_275_002	Date Extracted:	8-Feb-01
Date Collected:	31-Jan-01			QC Batch No.:	275	Date Analyzed:	14-FEB-01

Analyte	Conc. pg	DL pg	EMPC pg	Qualifier	Recoveries IS	Recoveries SS	Recoveries AS
2,3,7,8-TCDD	0.945			A B	98	102	86.2
1,2,3,7,8-PeCDD	2.44			A	108	105	86.2
1,2,3,4,7,8-HxCDD	EMPC		1.96	A	97.4	102	86.2
1,2,3,6,7,8-HxCDD	EMPC		5.04	A	97.4	102	86.2
1,2,3,7,8,9-HxCDD	2.76			A	97.4	102	86.2
1,2,3,4,6,7,8-HpCDD	21.5			A B	98.1	104	86.2
OCDD	57.1			A B	91.3	104	86.2
2,3,7,8-TCDF	8.77			A	94	102	86.2
1,2,3,7,8-PeCDF	15.2			A	95.4	105	86.2
2,3,4,7,8-PeCDF	36.1			A	95.4	105	86.2
1,2,3,4,7,8-HxCDF	40			A B	85.9	104	86.2
1,2,3,6,7,8-HxCDF	45.7			A	85.9	104	86.2
2,3,4,6,7,8-HxCDF	73.7				85.9	104	86.2
1,2,3,7,8,9-HxCDF	11.1			A	85.9	104	86.2
1,2,3,4,6,7,8-HpCDF	208			B	85.4	104	86.2
1,2,3,4,7,8,9-HpCDF	22.2			A	85.4	104	86.2
OCDF	118				88.9	104	86.2
Totals & TEQs							
TCDDs	13		15.6				
PeCDDs	31.3		33.9				
HxCDDs	42.9		49.9				
HpCDDs	44.4						
TCDFs	265						
PeCDFs	354		360				
HxCDFs	441						
HpCDFs	328						
Total PCDD/Fs	**1690**		**1710**				
TEQ (ND=0)	**41.9**		**42.6**	**ITEF**			
TEQ (ND=DL/2)	**41.9**		**42.6**	**ITEF**			

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Reviewer Cl
Date 25 Feb01

Sample ID: M23-3

Method M23

Client Data		Sample Data		Laboratory Data			
Name:	PES	Matrix:	Air	Project No.:	P1388	Date Received:	6-Feb-01
Project ID:	F181.001	Weight/Volume:	1	Sample ID:	P1388_275_003	Date Extracted:	8-Feb-01
Date Collected:	1-Feb-01			QC Batch No.:	275	Date Analyzed:	14-FEB-01

Analyte	Conc.	DL	EMPC	Qualifier	Recoveries		
	pg	pg	pg		IS	SS	AS
2,3,7,8-TCDD	ND	0.58			103	84	89.8
1,2,3,7,8-PeCDD	ND	1.63			111	83.5	89.8
1,2,3,4,7,8-HxCDD	2.54			A	102	84.1	89.8
1,2,3,6,7,8-HxCDD	4.63			A	102	84.1	89.8
1,2,3,7,8,9-HxCDD	EMPC		2.25	A	102	84.1	89.8
1,2,3,4,6,7,8-HpCDD	20.5			A B	103	85.7	89.8
OCDD	63.3			A B	94.1	85.7	89.8
2,3,7,8-TCDF	7.39			A	98.5	84	89.8
1,2,3,7,8-PeCDF	11.6			A	99.5	83.5	89.8
2,3,4,7,8-PeCDF	26.5			A	99.5	83.5	89.8
1,2,3,4,7,8-HxCDF	28.9			A B	90.2	82.3	89.8
1,2,3,6,7,8-HxCDF	35.5			A	90.2	82.3	89.8
2,3,4,6,7,8-HxCDF	60.2				90.2	82.3	89.8
1,2,3,7,8,9-HxCDF	8.99			A	90.2	82.3	89.8
1,2,3,4,6,7,8-HpCDF	172			B	87.7	85.7	89.8
1,2,3,4,7,8,9-HpCDF	18.8			A	87.7	85.7	89.8
OCDF	113				90.4	85.7	89.8
Totals & TEQs							
TCDDs	3.93		6.91				
PeCDDs	18.8						
HxCDDs	38.9		43				
HpCDDs	41.5						
TCDFs	205						
PeCDFs	277						
HxCDFs	345						
HpCDFs	274						
Total PCDD/Fs	**1380**		**1390**				
TEQ (ND=0)	**30.9**		**31.1**	**ITEF**			
TEQ (ND=DL/2)	**31.6**		**31.8**	**ITEF**			

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Reviewer CL

Date 25 Feb 01

P.228

ALTA ANALYTICAL PERSPECTIVES

PART 2

SAMPLE PATH

DOCUMENTATION FOR THE ANALYSIS
OF
POLYCHLORINATED DIBENZO-*p*-DIOXINS & DIBENZOFURANS

ALTA ANALYTICAL PERSPECTIVES

SAMPLE PATH

AAP PROJECT NO.: P1388
PROTOCOL: 23

SAMPLE PROCESSING

Extraction
- ☑ SDS
- ☑ Extraction Standards ($^{13}C_{12}$ - PCDD / F) "IS" & "SS"

Fractionation 50 %
- ☑ Alternate Standards "AS"
- ☑ Multi-Column Cleanup (ASECS)
- ☑ Final Extract

Analysis
- ☑ Injection Standards "RS"
- ☑ HRGC / HRMS
- ☑ 12-H Performance Checks

Interpretation
- ☑ ID Criteria
- ☑ Detection Limits
- ☑ Recoveries

SPIKE PROFILE

NS:	100 PG (10 µL; 0.01 NG/µL)	FOR OPR ONLY
IS:	4 NG (25 µL; 0.16 NG/µL)	
AS & SS:	4 NG (25 µL; 0.16 NG/µL)	
RS:	2 NG (10 µL; 0.2 NG/µL)	

SOPs

EXTRACTION:	AP-SP-E
FRACTIONATION:	AP-SP-CU
ANALYSIS:	AP-SP-A
CONCENTRATION:	AP-SP-N
FORTIFICATION:	AP-SP-F
DATA VALIDATION:	AP-SP-R

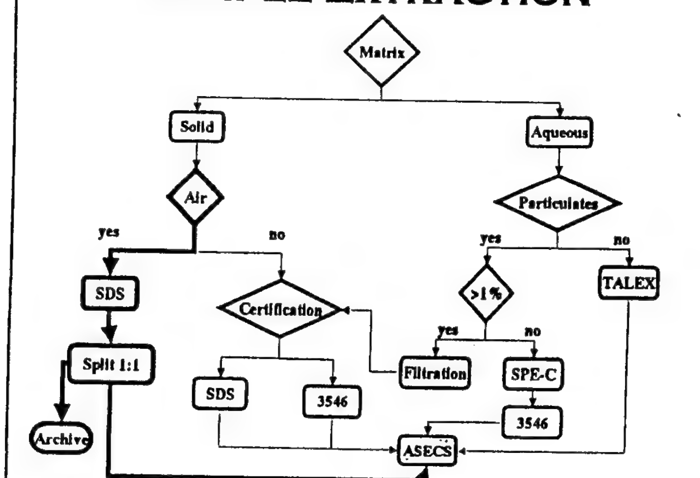
QC PROFILE

LMB:	ALWAYS REQUIRED
OPR:	ALWAYS REQUIRED

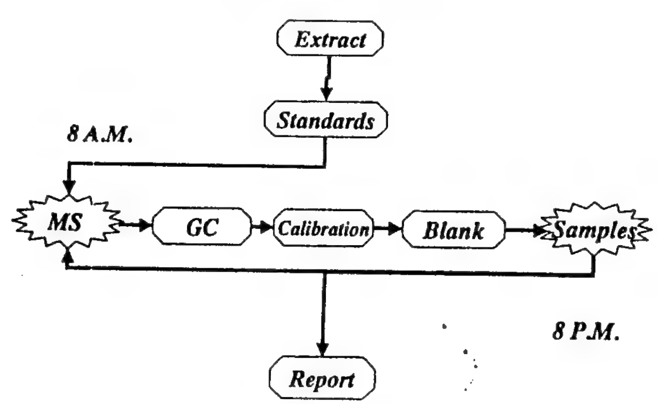
REPORTING PLATFORM

LEVEL: I II III PLATINUM

SAMPLE EXTRACTION



SAMPLE ANALYSIS



SPECIAL REQUIREMENTS

—

—

SUPPLIES IDs

SAND	—
TOLUENE	05499
ACID SILICA	01152001A
BASE SILICA	02062001A
SILICA	01182001
FLORISIL	SP02058
HEXANE	007436
CH_2Cl_2	003597
TETRADECANE	13807B

ALTA ANALYTICAL PERSPECTIVES

Project: P1388

Method(s): EPA Method 23

Extraction Set: 275

Chemist: CMR 02/08/01

Vial Box ID: —

ALTA Sample ID	Client Sample ID	PUF/Trap Prep Date	XAD Lot#	IS/NS CHEM/ WIT 25µl DATE 10µl (CMR 02/08/01)	Impinger Extraction Date NA	AS CHEM/WIT 25µl DATE (CMR 02/09/01)	C_{14} – 10µL SiGEL/MSF CHEM/Date N/A (Circle One) (YT 12Feb01)	ASECS CC CHEM/Date	RS CHEM/WIT 10µl DATE (YT 13Feb01)
0_275_MB001	—	—	—	BT —	—	BT 02-09-01	GO 12FEB01	GO 12FEB01	GO 13Feb01
0_275_OPR001	—	—	—	BT 02-08-01 * BT	—	BT	GO	GO	GO
P1388_275_001	M23-1	—	—	BT —	—	BT	GO	GO	GO
P1388_275_002	M23-2	—	—	BT —	—	BT	GO	GO	GO
P1388_275_003	M23-3	—	—	BT —	—	BT	GO	GO	GO

001 1 filter - dry, white, grey - yellow XAD - sticky, no coloration glued blackish grey, white, wet smokey odor

002 1 filter - dry, grey XAD - trap arrived broken on front end XAD sticky no coloration glued wet, white

003 1 filter - dry, grey yellow XAD - sticky, no coloration glued wet, white

02/22/01 Took Anomia vial* CMR and put it in a mini vial. N₂'d to 8µl Added 9µl RS for final vol of 16µl. Labeled vial as such and sent to MSpec.

P1370
PACIFIC ENVIROMENTAL SERVICI
PREP.: 01 JAN 25
EXPIRATION: 02 FEB 08
4 NG SAMPLING STANDARDS PCDD/Fs
INITIALS: JCF

11Feb01

001: final extract is yellow. Y.T.

↳ Diluted final extract before GC/MS.

(x10x) { 2µL of 10µL final volume + 2µL of RS (0.2ng/µL) + 16µL of C_{14} (-2)

* note: original vial contains 10µL C_{14} - No RS added to it → cap, store/save. Y.T.

IS ID #1: 000919C 428-IS exp 09/19/02	NS ID #1: 000919D 428-NS exp 09/19/02	AS ID #1: 000919B 428-AS exp 09/19/02	RS ID #1: 000919E 428-RS exp 09/19/02	Cycle #1: 02/08/01 Start 5:30pm	#2: —	Split / /	Check Out: Chemist: CMR 02/08/01
IS ID #2: —	NS ID #2: —	AS ID #2: —	RS ID #2: * VH1				
IS ID #3: —	NS ID #3: —	AS ID #3: —	RS ID #3: —	02/09/01 Stop: 11:30Am	—	1:4 1:2	Check-In: Chemist: — / /
IS ID #4: —	NS ID #4: —	AS ID #4: —	RS ID #4: —				

ALTA ANALYTICAL PERSPECTIVES

SAMPLE PATH

AAP PROJECT NO.: P1388
PROTOCOL: 23

COMMUNICATIONS

ce 25Feb01

ALTA ANALYTICAL PERSPECTIVES

Sample Inventory Report: MM5 Sampling Train

Project No.: P1388 **Project Name:** General Analytical HRMS

Date Rec.: 6-Feb-01

Lab. Sample ID	Collection Date	Client Sample ID	Component ID
001	31-Jan-01	M23-1	Ace/Me
	31-Jan-01		Filter
	31-Jan-01		XAD
002	31-Jan-01	M23-2	Ace/Me
	31-Jan-01		Filter
	31-Jan-01		XAD
003	1-Feb-01	M23-3	Ace/Me
	1-Feb-01		Filter
	1-Feb-01		XAD
004	1-Feb-01	Reagent Blk	Ace/Me
	1-Feb-01	Hold	Toluene
	1-Feb-01		XAD

CM

06 Feb 01

SmpinvmS.rpt

PROCESS SHEET

Project No.-AR: P1388-1 of 1
Client: Pacific Environmental Services (PAENC01A)
Client Manager: Yves Tondeur

Project Due: 2/27/01
TAT: 21
Extraction Due: 3/2/01

Method: EPA Method 23
Extraction Type: EPA Method 23

Matrix: MM5
Split Type: 1:2

Component: PCDD/F (Tetra - Octa)

LabID	Client-ID	Component Type	Client Component ID	Date Received	SLoc
001	M23-1	Filter#1	Filter	2/6/01	F-2
		Solvent#1	Ace/Me	2/6/01	F-2
		XAD#1	XAD	2/6/01	F-2
002	M23-2	Filter#1	Filter	2/6/01	F-2
		Solvent#1	Ace/Me	2/6/01	F-2
		XAD#1	XAD	2/6/01	F-2
003	M23-3	Filter#1	Filter	2/6/01	F-2
		Solvent#1	Ace/Me	2/6/01	F-2
		XAD#1	XAD	2/6/01	F-2

Instructions:

Report Options

Report Level: 1

EDD Type:

Vial Box ID: ____________

Date Requested: 2/20/01

HRMSAirAR.rpt

PACIFIC ENVIRONMENTAL SERVICES, INC.

Central Park West
5001 South Miami Boulevard, P.O. Box 12077
Research Triangle Park, North Carolina 27709-2077
(919) 941-0333 FAX: (919) 941-0234

Chain of Custody Record

Project Numb: F181.001

Project Name: Andrews AFB Medical Waste Incinerator

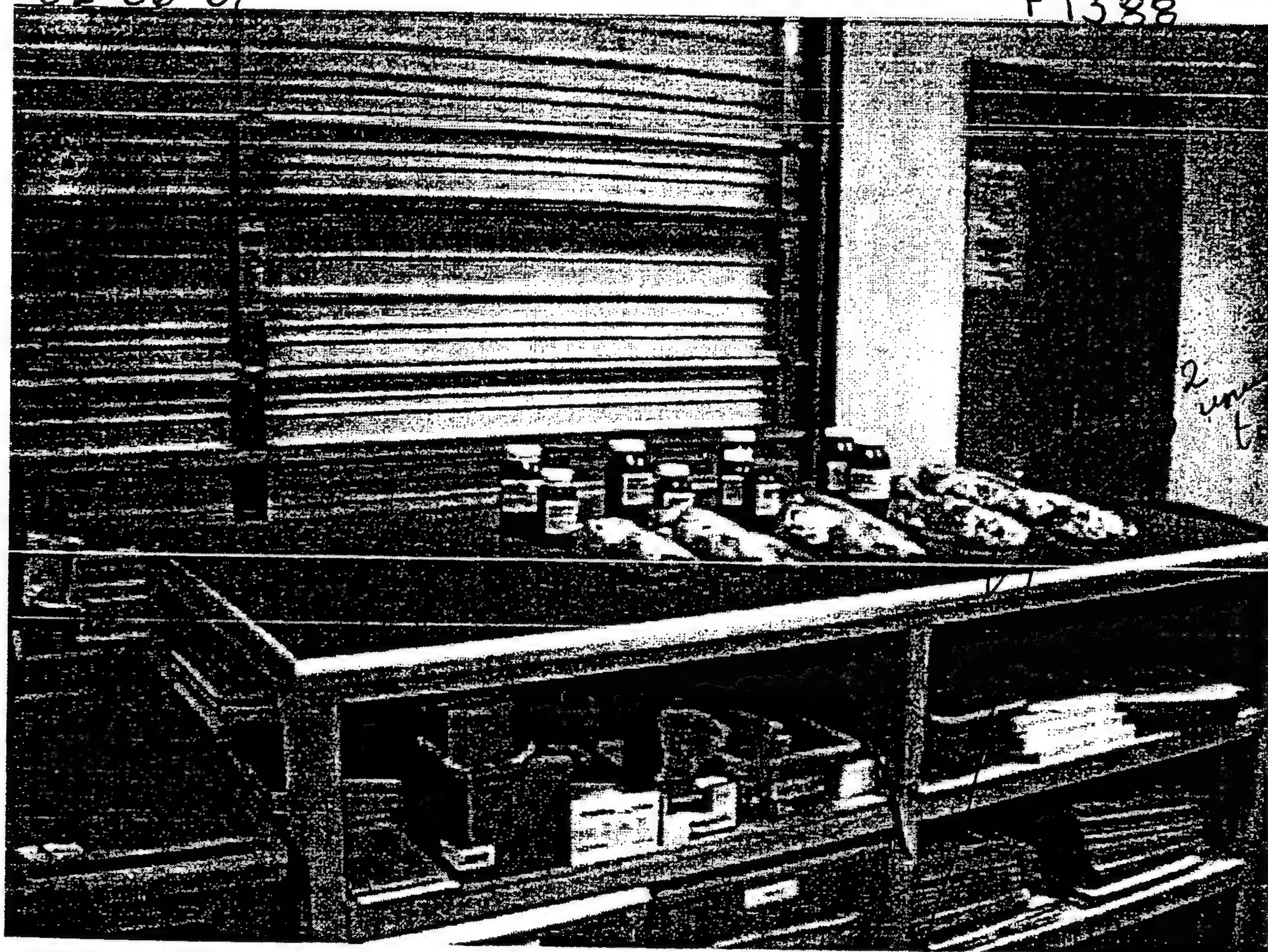
Samplers: DD Holzschuh, J Falank, MD Maret

Date	Time	Field Sample ID	Sample Description	PCDD	PCDF						Remarks
1/31/01	1000	M23-1-1	Filter, dry	•	•						
1/31/01	1000	M23-1-2	XAD Sorbent Module	•	•						
1/31/01	1000	M23-1-3	Front Half Back Half Acetone/Toluene rince	•	•						
1/31/01	1000	M23-1-4A	Impinger Contents Fraction 1	•	•						
1/31/01	1000	M23-1-4B	Impinger Contents Fraction 2	•	•						
1/31/01	1500	M23-2-1	Filter, dry	•	•						
1/31/01	1500	M23-2-2	XAD Sorbent Module	•	•						
1/31/01	1500	M23-2-3	Front Half Back Half Acetone/Toluene rince	•	•						
1/31/01	1500	M23-2-4A	Impinger Contents Fraction 1	•	•						
1/31/01	1500	M23-2-4A	Impinger Contents Fraction 2	•	•						
2/1/01	0900	M23-3-1	Filter, dry	•	•						
2/1/01	0900	M23-3-2	XAD Sorbent Module	•	•						
2/1/01	0900	M23-3-3	Front Half Back Half Acetone/Toluene rince	•	•						
2/1/01	0900	M23-3-3A	Front Half Back Half Acetone/Toluene rince	•	•						→ ~~missing~~ not labeled correctly: M23-3 FH/BH 2nd Fract.
2/1/01	0900	M23-3-4A	Impinger Contents Fraction 1	•	•						
2/1/01	0900	M23-3-4B	Impinger Contents Fraction 2	•	•						
2/1/01	1400	M23-B-2	XAD Sorbent Module	•	•						Archive
2/1/01	1400	M23-DI	HPLC Water Reagent	•	•						Archive
2/1/01	1400	M23-A	Acetone Reagent Blank	•	•						Archive
2/1/01	1400	M23-T	Toluene Reagent Blank	•	•						Archive

Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Relinquished by: (Signature)	Date/Time	Received by: (Signature)
[signature]	2/6/01 10:20	[signature]			
Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Relinquished by: (Signature)	Date/Time	Received by: (Signature)
	2-6-01 1:25	[signature]			
Relinquished by: (Signature)	Date/Time	Received for lab by: (Signature)	REMARKS		
[signature]	2/2/01				

02-06-01

P1388



2 vernal traps.

Note: Imp. Catch (2 bottles) s/le)
not shown.

TiT
06Feb01.

BLANK
(Hold)

STANDARD OPERATING PROCEDURE

ALTA ANALYTICAL PERSPECTIVES

Attachment 1

ALTA ANALYTICAL PERSPECTIVES Project No.: P 1388

Sample Log-In Checklist	Yes	No
1. Date Samples Arrived: 02-06-01 Initials: BT		
2. Time / Date logged in: 1:28 02-06-01 Location F-2 Initials: BT		
3. Samples Arrived By: (circle one) Airborne Express Federal Express UPS Emery Freezer Truck Company Courier DHL Other		
4. Shipping Preservation: (circle) Ice / Blue Ice / Dry Ice None **Temp °C** 19°		
5. Shipping Documentation Present? (circle one) Shipping Label Airbill Tracking Number		✓
6. Shipping Container(s) Intact? If no, describe condition below.	✓	
7. Container Custody Seals Present and Intact? If not intact, describe condition below.		✓
8. Sample Custody Seals Present and Intact? If not intact, describe condition below. No. of Seals ______ or Seal No.		✓
9. Sample Container Intact? If no, indicate sample condition below.	✓	
10. Chain of Custody (COC) or other Sample Documentation Present?	✓	
11. COC/Documentation Acceptable? If no, complete COC Anomaly Form.	✓	
12. Shipping Container: (circle) ALTA ANALYTICAL PERSPECTIVES Return or Retain or Dispose; Client Return or Retain or Dispose		
13. Container and/or Bottles Requested?		✓
14. Sample Control Check In/Out Log Completed?	✓	
15. Drinking Water Sample? If yes, Acceptable Preservation? (circle) Y or N		✓
16. Imported Soil? If yes, apply appropriate label.		✓

Name: [illegible] Date Samples Reconciled: ________

Comments:

Alta Analytical Perspectives - Injection Log Run file: 010214P1 GC Column ID: db-5

Data file	S#	Vial#	Lab ID	Sample ID (Chrom. Text)	Analyst	Acq date	Acq time
010214P1	1	3	CS3RC	DB5 CPSM / M23 CS3	GAG	14-FEB-01	11:05:47 ✓
010214P1	2	76	0_275_OPR001	0_275_OPR001	GAG	14-FEB-01	11:57:29
010214P1	3	77	0_275_MB001	0_275_MB001	GAG	14-FEB-01	12:49:16
010214P1	4	78	P1388_275_001D10	P1388_275_001 M23-1 Air Train D10 not processed 2e st. run	GAG	14-FEB-01	13:41:03
010214P1	5	79	P1388_275_002	P1388_275_002 M23-2 Air Train	GAG	14-FEB-01	14:32:45
010214P1	6	80	P1388_275_003	P1388_275_003 M23-3 Air Train	GAG	14-FEB-01	15:24:32
010214P1	7	3	CS3RC	DB5 CPSM / M23 CS3	GAG	14-FEB-01	16:16:11 ✓
010223P1	1	3	CS3RC	DB5 CPSM / M23 CS3	GAG	23-FEB-01	11:17:52 ✓
010223P1	2	15	SB	SOLVENT BLANK	GAG	23-FEB-01	12:09:30
010223P1	3	65	P1388_275_001CU	P1388_275_001 M23-1 Air Train CU	GAG	23-FEB-01	13:01:16
010223P1	4	3	CS3RC	DB5 CPSM / M23 CS3	GAG	23-FEB-01	13:52:50 ✓

resolution plot for function 5 of ending CS3 on 14 Feb01 not printed
(SIOS communication lost while centroiding Function 5 - System had to be rebooted)
OK Y.T.

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ALTA ANALYTICAL PERSPECTIVES

PART 3

ANALYTICAL RESULTS

DOCUMENTATION FOR THE ANALYSIS
OF
POLYCHLORINATED DIBENZO-*P*-DIOXINS & DIBENZOFURANS

Sample ID: 0_275_MB001

Method M23

Client Data		Sample Data		Laboratory Data			
Name:	PES	Matrix:	Air	Project No.:	P1388	Date Received:	n/a
Project ID:	F181.001	Weight/Volume:	1	Sample ID:	0_275_MB001	Date Extracted:	8-Feb-01
Date Collected:	n/a			QC Batch No.:	275	Date Analyzed:	14-FEB-01

Analyte	Conc.	DL	EMPC	Qualifier	Recoveries		
	pg	pg	pg		IS	SS	AS
2,3,7,8-TCDD	EMPC		1.29	A	99.6	98.2	85.4
1,2,3,7,8-PeCDD	ND	0.997			100	96.4	85.4
1,2,3,4,7,8-HxCDD	ND	1.68			100	97.1	85.4
1,2,3,6,7,8-HxCDD	ND	1.87			100	97.1	85.4
1,2,3,7,8,9-HxCDD	ND	1.68			100	97.1	85.4
1,2,3,4,6,7,8-HpCDD	EMPC		1.9	A	100	99.1	85.4
OCDD	12.9			A	95.7	99.1	85.4
2,3,7,8-TCDF	ND	1.27			100	98.2	85.4
1,2,3,7,8-PeCDF	ND	1.84			93.6	96.4	85.4
2,3,4,7,8-PeCDF	ND	1.81			93.6	96.4	85.4
1,2,3,4,7,8-HxCDF	1.69			A	86.5	97.3	85.4
1,2,3,6,7,8-HxCDF	ND	0.552			86.5	97.3	85.4
2,3,4,6,7,8-HxCDF	ND	0.586			86.5	97.3	85.4
1,2,3,7,8,9-HxCDF	ND	0.67			86.5	97.3	85.4
1,2,3,4,6,7,8-HpCDF	1.86			A	88	99.1	85.4
1,2,3,4,7,8,9-HpCDF	ND	2.03			88	99.1	85.4
OCDF	ND	2.83			91	99.1	85.4
Totals & TEQs							
TCDDs	ND		1.29				
PeCDDs	ND	0.997					
HxCDDs	ND	1.74					
HpCDDs	1.83		3.73				
TCDFs	ND	1.27					
PeCDFs	ND	1.83					
HxCDFs	1.69						
HpCDFs	1.86						
Total PCDD/Fs	**18.3**		**21.5**				
TEQ (ND=0)	**0.200**		**1.5**	**ITEF**			
TEQ (ND=DL/2)	**1.38**		**2.68**	**ITEF**			

ALTA ANALYTICAL PERSPECTIVES

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Reviewer Ce
Date 25 Feb Ø1

Client ID: 0_275_MB001 Filename: 010214P1 S: 3 Acq: 14-FEB-01 12:49:16 ConCal: 010214P1-
Lab ID: 0_275_MB001 GC Column ID: db-5 ICal: MM1_M23_0, wt/vol: 1.000 EndCal: 010214P1-

	Name	Resp	RA		RRF	RT	Conc	Qualif.	CDE	noise	Fac	DL	Rec	EMPC
	2,3,7,8-TCDD	2.88e+04	0.39	n	1.26	27:45	1.29			837	2.5	0.685		
	1,2,3,7,8-PeCDD	*	*	n	1.01	NotF,	*			596	2.5	0.997		
	1,2,3,4,7,8-HxCDD	*	*	n	1.14	NotF,	*			1072	2.5	1.68		
	1,2,3,6,7,8-HxCDD	*	*	n	1.02	NotF,	*			1072	2.5	1.87		
	1,2,3,7,8,9-HxCDD	*	*	n	1.14	NotF,	*			1072	2.5	1.68		
	1,2,3,4,6,7,8-HpCDD	2.58e+04	1.46	n	1.13	41:31	1.90			748	2.5	1.58		
	OCDD	1.23e+05	0.88	y	1.03	46:51	12.9			700	2.5	2.49		
	2,3,7,8-TCDF	*	*	n	1.05	NotF,	*			1614	2.5	1.27		
	1,2,3,7,8-PeCDF	*	*	n	1.04	NotF,	*			1607	2.5	1.84		
	2,3,4,7,8-PeCDF	*	*	n	1.05	NotF,	*			1607	2.5	1.81		
	1,2,3,4,7,8-HxCDF	2.81e+04	1.13	y	1.13	36:08	1.69			788	2.5	0.603		
	1,2,3,6,7,8-HxCDF	*	*	n	1.24	NotF,	*			788	2.5	0.552		
	2,3,4,6,7,8-HxCDF	*	*	n	1.16	NotF,	*			788	2.5	0.586		
	1,2,3,7,8,9-HxCDF	*	*	n	1.02	NotF,	*			788	2.5	0.670		
	1,2,3,4,6,7,8-HpCDF	3.02e+04	1.05	y	1.54	39:53	1.86			1564	2.5	1.71		
	1,2,3,4,7,8,9-HpCDF	*	*	n	1.30	NotF,	*			1564	2.5	2.03		
	OCDF	*	*	n	1.15	NotF,	*			962	2.5	2.83		
	Total Tetra-Dioxins	*	*	n	1.26	NotF,	*			837	2.5	0.685		1.29
	Total Penta-Dioxins	*	*	n	1.01	NotF,	*			596	2.5	0.997		*
	Total Hexa-Dioxins	*	*	n	1.10	NotF,	*			1072	2.5	1.74		*
	Total Hepta-Dioxins	2.49e+04	1.04	y	1.13	40:19	1.83			748	2.5	1.58		3.73
	Total Tetra-Furans	*	*	n	1.05	NotF,	*			1614	2.5	1.27		*
	1st Fnc. Penta-Furans	*	*	n	1.05	NotF,	*			1804	2.5	2.05		*
	Total Penta-Furans	*	*	n	1.05	NotF,	*			1607	2.5	1.83		
	PeCDF Totals:						0.00							0.00
	Total Hexa-Furans	2.81e+04	1.13	y	1.14	36:08	1.69			788	2.5	0.600		1.69
	Total Hepta-Furans	3.02e+04	1.05	y	1.42	39:53	1.86			1564	2.5	1.86		1.86
IS	13C-2,3,7,8-TCDD	7.11e+07	0.79	y	1.13	27:43	3980						99.6	
IS	13C-1,2,3,7,8-PeCDD	5.84e+07	1.58	y	0.93	33:11	4010						100	
IS	13C-1,2,3,6,7,8-HxCDD	4.96e+07	1.25	y	0.93	37:12	4000						100	
IS	13C-1,2,3,4,6,7,8-HpCDD	4.82e+07	1.04	y	0.91	41:30	4010						100	
IS	13C-OCDD	3.73e+07	0.90	y	0.73	46:50	3830						95.7	
IS	13C-2,3,7,8-TCDF	8.92e+07	0.77	y	1.06	26:50	4000						100	
IS	13C-1,2,3,7,8-PeCDF	7.53e+07	1.54	y	0.96	31:42	3740						93.6	
IS	13C-1,2,3,6,7,8-HxCDF	5.89e+07	0.52	y	1.28	36:15	3460						86.5	
IS	13C-1,2,3,4,6,7,8-HpCDF	4.22e+07	0.44	y	0.90	39:52	3520						88.0	
IS	13C-OCDF	3.92e+07	0.89	y	0.81	47:09	3640						91.0	
RS/RT	13C-1,2,3,4-TCDD	6.29e+07	0.79	y	1.00	27:04	4000						-	
RS	13C-1,2,3,4-TCDF	8.40e+07	0.77	y	1.00	25:28	4000						-	
RS/RT	13C-1,2,3,7,8,9-HxCDD	5.31e+07	1.26	y	1.00	37:31	4000						-	
PS	37Cl-2,3,7,8-TCDD	3.59e+07			0.51	27:45	3930						98.2	
PS	13C-2,3,4,7,8-PeCDF	7.06e+07	1.55	y	0.97	32:50	3850						96.4	
PS	13C-1,2,3,4,7,8-HxCDD	4.44e+07	1.26	y	0.92	37:05	3890						97.1	
PS	13C-1,2,3,4,7,8-HxCDF	5.21e+07	0.52	y	0.91	36:06	3890						97.3	
PS	13C-1,2,3,4,7,8,9-HpCDF	3.57e+07	0.43	y	0.85	42:19	3970						99.1	
AS	13C-1,2,3,7,8,9-HxCDF	4.85e+07	0.52	y	1.07	37:55	3420						85.4	

Reviewer: Ce
Date: 24 Feb 01

Analyst: GAG
Date: 23 Feb 01

y.c.

Totals class: TCDD EMPC Function: 1 Run #: 10
File Name: 010214P1 Sample #: 3 Sample text: 0_275_MB001

Acquired: 14-FEB-01 12:49:16 Processed: 20-FEB-01 12:06:57

Total Conc.: 1.2852 Unnamed Conc.: *

RT	m1 Resp	mod.	m2 Resp	mod.	RA		Resp	Adj_Resp	S/N		Conc.	Name
27:45	1.254e+04	y	3.230e+04	n	0.39	n	4.484e+04	2.882e+04	1.07e+01	y	1.29	2,3,7,8-TCDD

Totals class: PeCDD EMPC Function: 2 Run #: 10
File Name: 010214P1 Sample #: 3 Sample text: 0_275_MB001

Acquired: 14-FEB-01 12:49:16 Processed: 20-FEB-01 12:06:57

Total Conc.: * Unnamed Conc.: *

RT	m1 Resp	mod.	m2 Resp	mod.	RA		Resp	Adj_Resp	S/N		Conc.	Name
NotF.	*	n	*	n	*	n	*	*	*	n	*	

Totals class: HxCDD EMPC Function: 3 Run #: 10
File Name: 010214P1 Sample #: 3 Sample text: 0_275_MB001

Acquired: 14-FEB-01 12:49:16 Processed: 20-FEB-01 12:06:57

Total Conc.: * Unnamed Conc.: *

RT	m1 Resp	mod.	m2 Resp	mod.	RA		Resp	Adj_Resp	S/N		Conc.	Name
NotF.	*	n	*	n	*	n	*	*	*	n	*	

Totals class: HpCDD EMPC Function: 4 Run #: 10
File Name: 010214P1 Sample #: 3 Sample text: 0_275_MB001

Acquired: 14-FEB-01 12:49:16 Processed: 20-FEB-01 12:06:57

Total Conc.: 3.7295 Unnamed Conc.: 1.832

RT	m1 Resp	mod.	m2 Resp	mod.	RA		Resp	Adj_Resp	S/N		Conc.	Name
40:19	1.273e+04	y	1.221e+04	y	1.04	y	2.494e+04	2.494e+04	2.95e+00	y	1.83	
41:31	1.854e+04	y	1.266e+04	y	1.46	n	3.120e+04	2.583e+04	2.38e+00	n	1.90	1,2,3,4,6,7,8-HpCDD

Totals class: TCDF EMPC Function: 1 Run #: 10

File Name: 010214P1 Sample #: 3 Sample text: 0_275_MB001

Acquired: 14-FEB-01 12:49:16 Processed: 20-FEB-01 12:06:57

Total Conc.: * Unnamed Conc.: *

RT	m1 Resp	mod.	m2 Resp	mod.	RA		Resp	Adj_Resp	S/N		Conc.	Name
NotF.	*	n	*	n	*	n	*	*	*	n	*	

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Totals class: 1st Fnc.PeCDF EMPC Function: 1 Run #: 10
File Name: 010214P1 Sample #: 3 Sample text: 0_275_MB001

Acquired: 14-FEB-01 12:49:16 Processed: 20-FEB-01 12:06:57

Total Conc.: * Unnamed Conc.: *

RT	m1 Resp	mod.	m2 Resp	mod.	RA		Resp	Adj_Resp	S/N		Conc.	Name
NotF.	*	n	*	n	*	n	*	*	*	n	*	

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Totals class: PeCDF EMPC Function: 2 Run #: 10
File Name: 010214P1 Sample #: 3 Sample text: 0_275_MB001

Acquired: 14-FEB-01 12:49:16 Processed: 20-FEB-01 12:06:57

Total Conc.: * Unnamed Conc.: *

RT	m1 Resp	mod.	m2 Resp	mod.	RA		Resp	Adj_Resp	S/N		Conc.	Name
NotF.	*	n	*	n	*	n	*	*	*	n	*	1,2,3,7,8-PeCDF

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Totals class: HxCDF EMPC Function: 3 Run #: 10
File Name: 010214P1 Sample #: 3 Sample text: 0_275_MB001

Acquired: 14-FEB-01 12:49:16 Processed: 20-FEB-01 12:06:57

Total Conc.: 1.6885 Unnamed Conc.: *

RT	m1 Resp	mod.	m2 Resp	mod.	RA		Resp	Adj_Resp	S/N		Conc.	Name
36:08	1.490e+04	y	1.322e+04	y	1.13	y	2.813e+04	2.813e+04	5.10e+00	y	1.69	1,2,3,4,7,8-HxCDF

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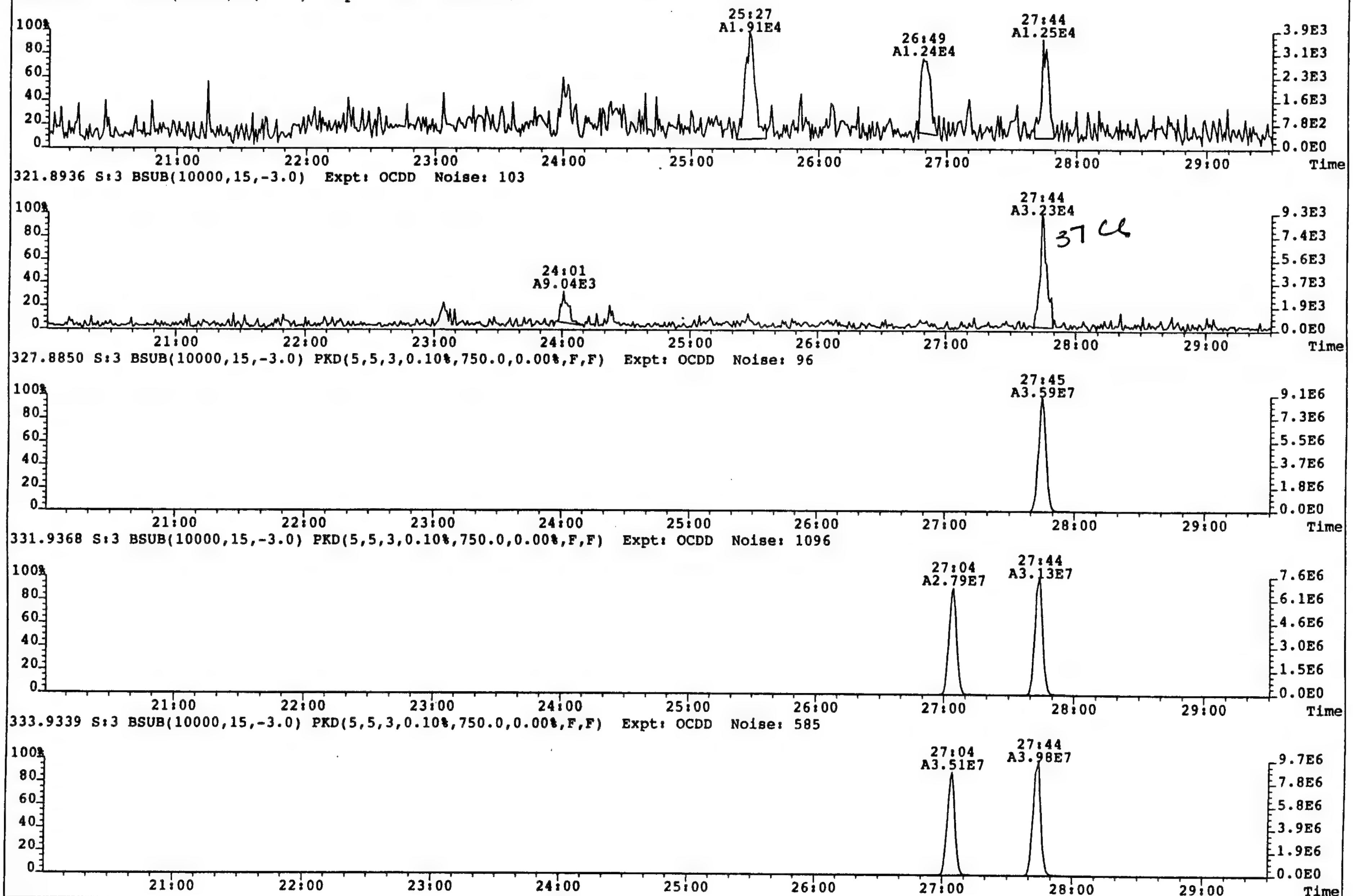
Totals class: HpCDF EMPC Function: 4 Run #: 10
File Name: 010214P1 Sample #: 3 Sample text: 0_275_MB001

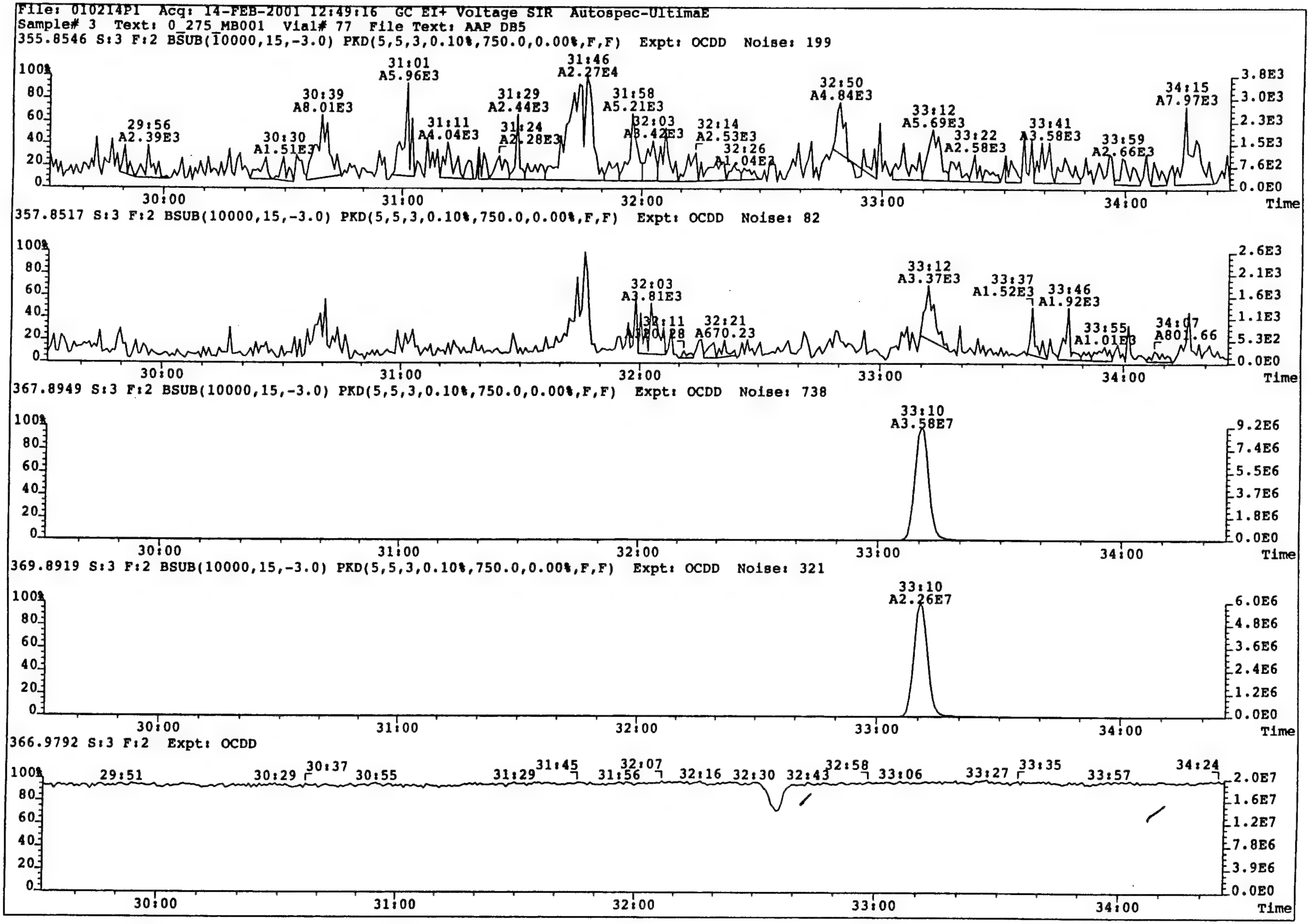
Acquired: 14-FEB-01 12:49:16 Processed: 20-FEB-01 12:06:57

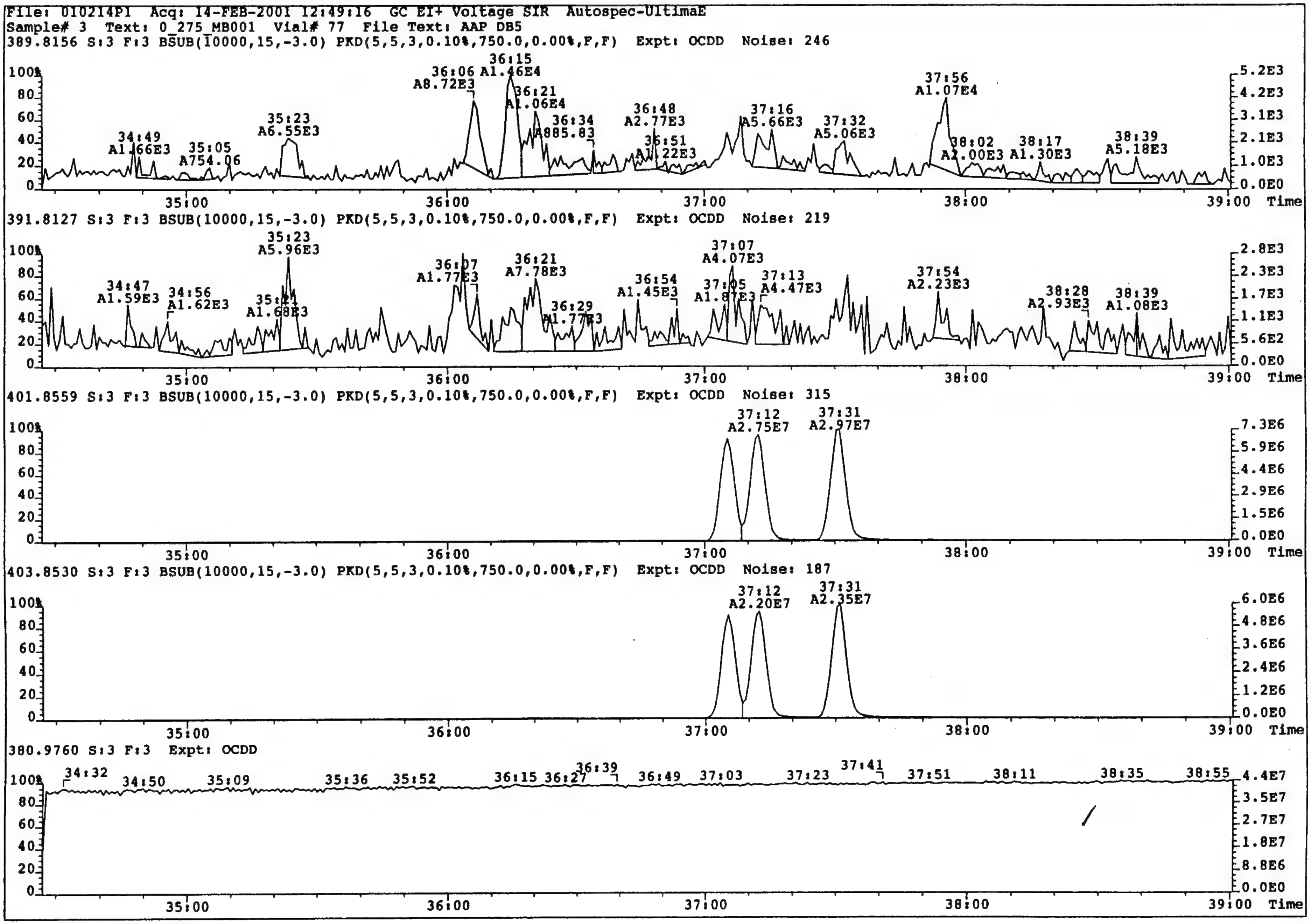
Total Conc.: 1.8583 Unnamed Conc.: *

RT	m1 Resp	mod.	m2 Resp	mod.	RA		Resp	Adj_Resp	S/N		Conc.	Name
39:53	1.546e+04	y	1.477e+04	y	1.05	y	3.023e+04	3.023e+04	2.35e+00	n	1.86	1,2,3,4,6,7,8-HpCDF

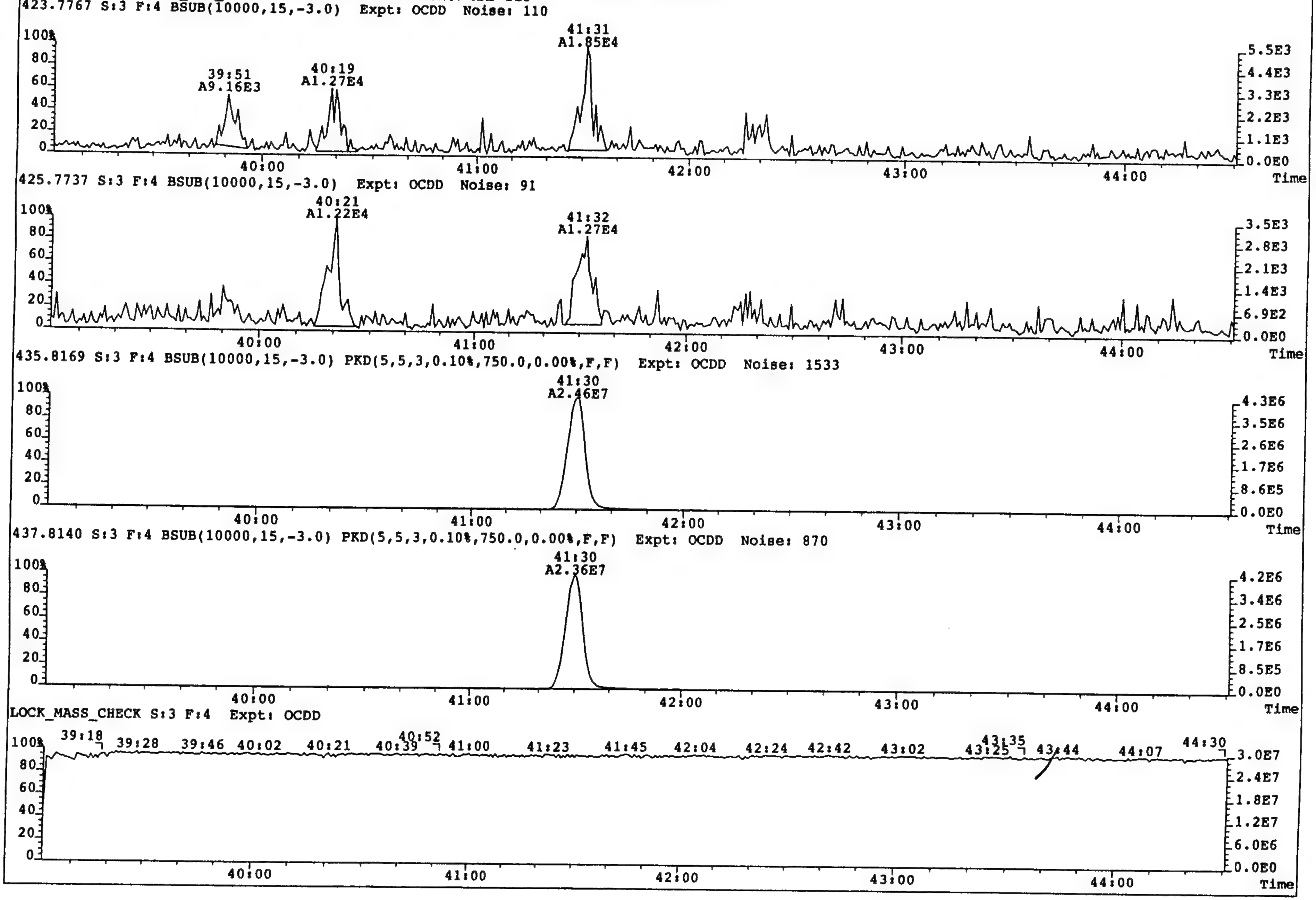
File: 010214P1 Acq: 14-FEB-2001 12:49:16 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 3 Text: 0_275_MB001 Vial# 77 File Text: AAP DB5
319.8965 S:3 BSUB(10000,15,-3.0) Expt: OCDD Noise: 192

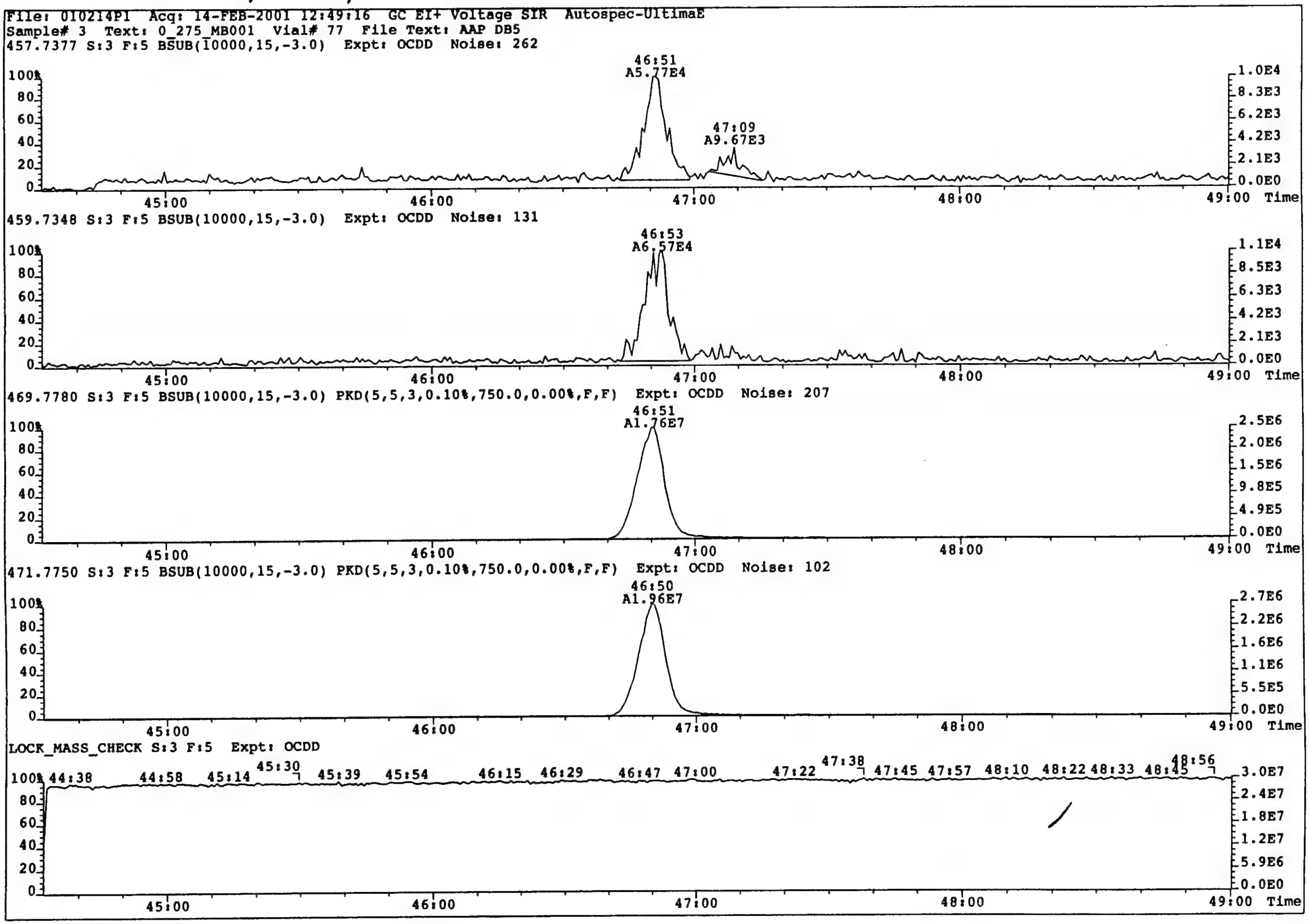



File: 010214P1 Acq: 14-FEB-2001 12:49:16 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 3 Text: 0_275_MB001 Vial# 77 File Text: AAP DB5
355.8546 S:3 F:2 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 199
357.8517 S:3 F:2 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 82
367.8949 S:3 F:2 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 738
33:10
A3.58E7
369.8919 S:3 F:2 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 321
33:10
A2.26E7
366.9792 S:3 F:2 Expt: OCDD
Time

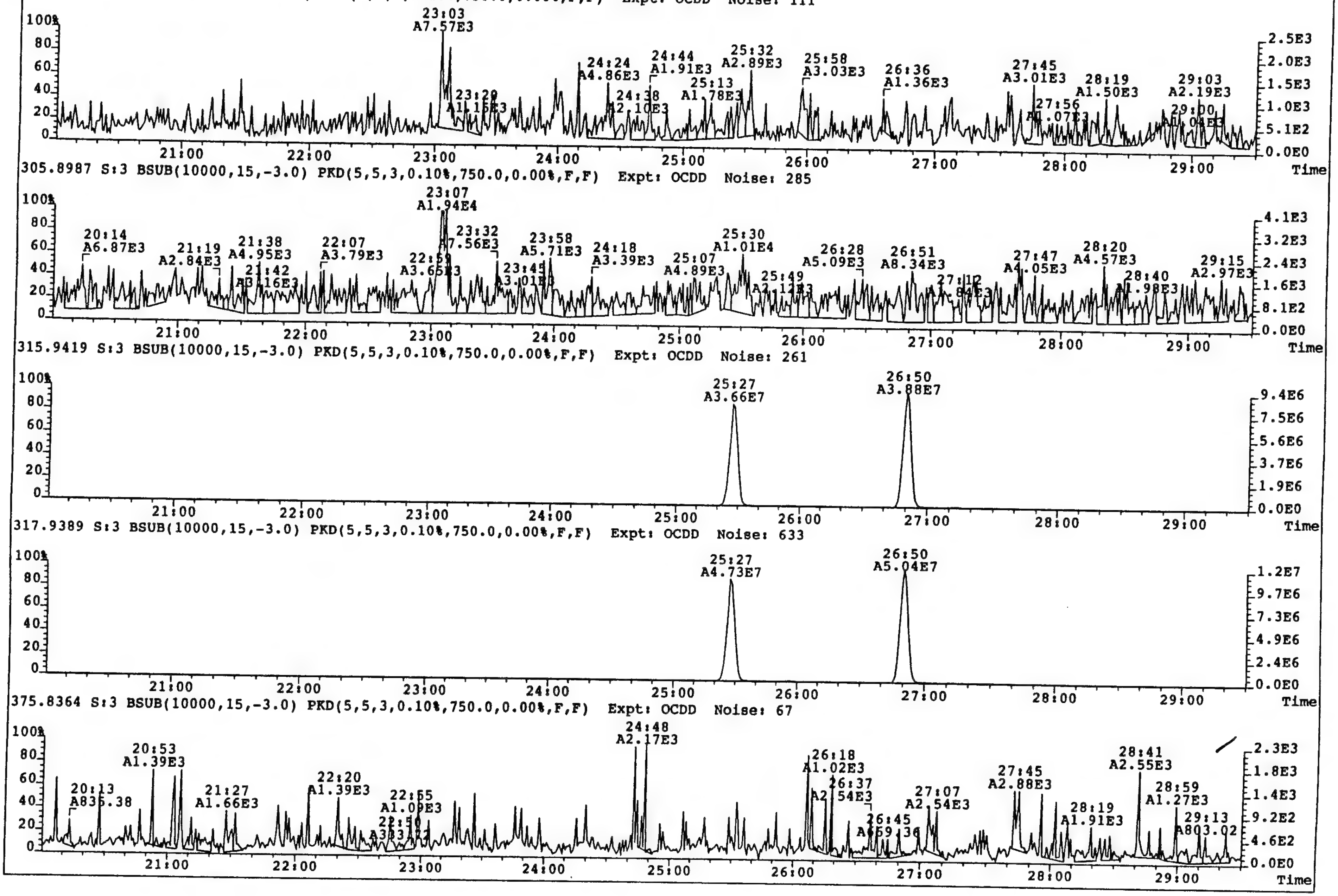

File: 010214P1 Acq: 14-FEB-2001 12:49:16 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 3 Text: 0_275_MB001 Vial# 77 File Text: AAP DB5
389.8156 S:3 F:3 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 246
391.8127 S:3 F:3 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 219
401.8559 S:3 F:3 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 315
37:12 A2.75E7
37:31 A2.97E7
403.8530 S:3 F:3 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 187
37:12 A2.20E7
37:31 A2.35E7
380.9760 S:3 F:3 Expt: OCDD
Time

File: 010214P1 Acq: 14-FEB-2001 12:49:16 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 3 Text: 0_275_MB001 Vial# 77 File Text: AAP DB5

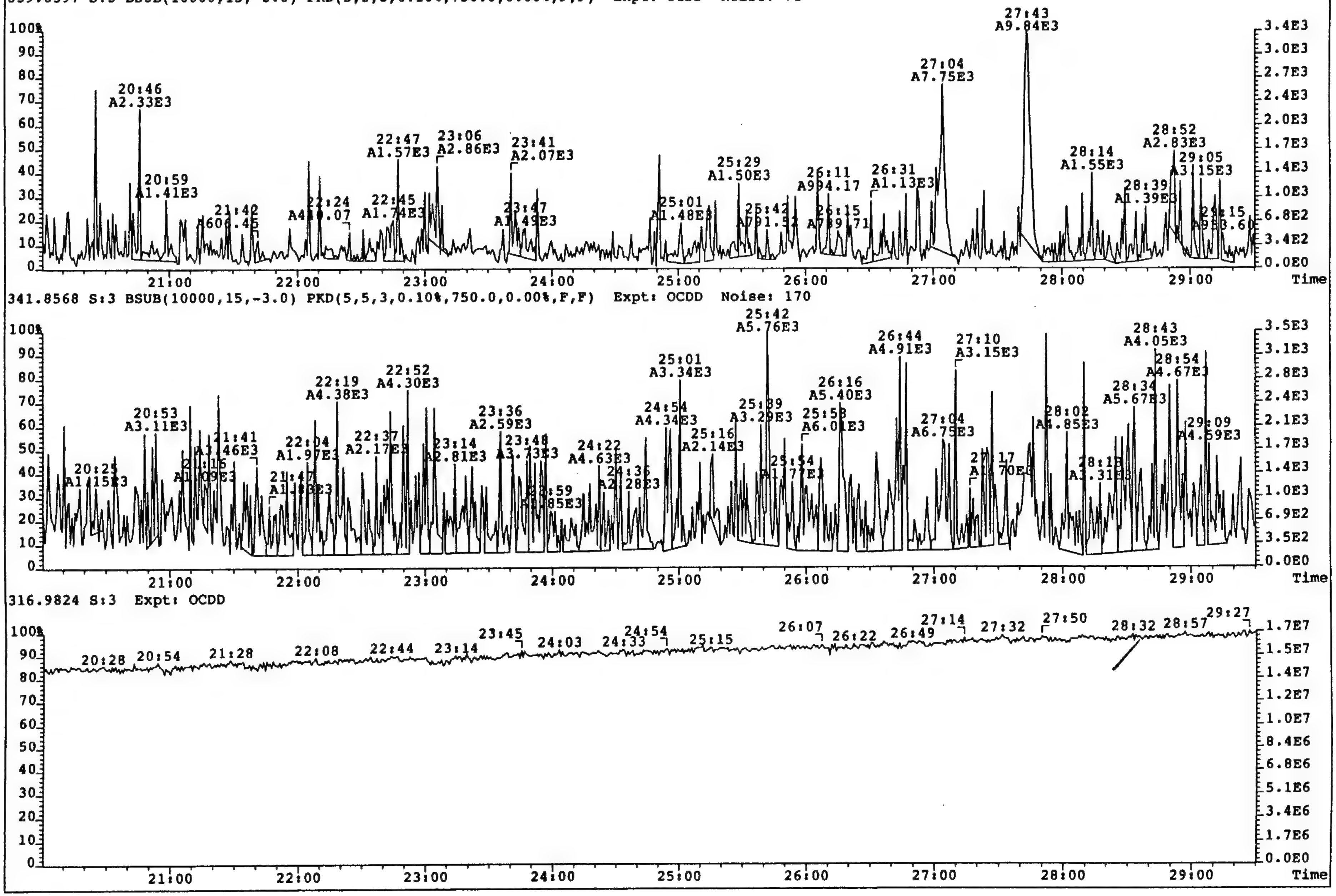



File: 010214P1 Acq: 14-FEB-2001 12:49:16 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 3 Text: 0_275_MB001 Vial# 77 File Text: AAP DB5
457.7377 S:3 F:5 BSUB(10000,15,-3.0) Expt: OCDD Noise: 262
46:51
A5.77E4
47:09
A9.67E3
100%
80
60
40
20
0
1.0E4
8.3E3
6.2E3
4.2E3
2.1E3
0.0E0
45:00
46:00
47:00
48:00
49:00
Time
459.7348 S:3 F:5 BSUB(10000,15,-3.0) Expt: OCDD Noise: 131
46:53
A6.57E4
1.1E4
8.5E3
6.3E3
4.2E3
2.1E3
0.0E0
469.7780 S:3 F:5 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 207
46:51
A1.76E7
2.5E6
2.0E6
1.5E6
9.8E5
4.9E5
0.0E0
471.7750 S:3 F:5 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 102
46:50
A1.96E7
2.7E6
2.2E6
1.6E6
1.1E6
5.5E5
0.0E0
LOCK_MASS_CHECK S:3 F:5 Expt: OCDD
44:38
44:58
45:14
45:30
45:39
45:54
46:15
46:29
46:47
47:00
47:22
47:38
47:45
47:57
48:10
48:22
48:33
48:45
48:56
3.0E7
2.4E7
1.8E7
1.2E7
5.9E6
0.0E0

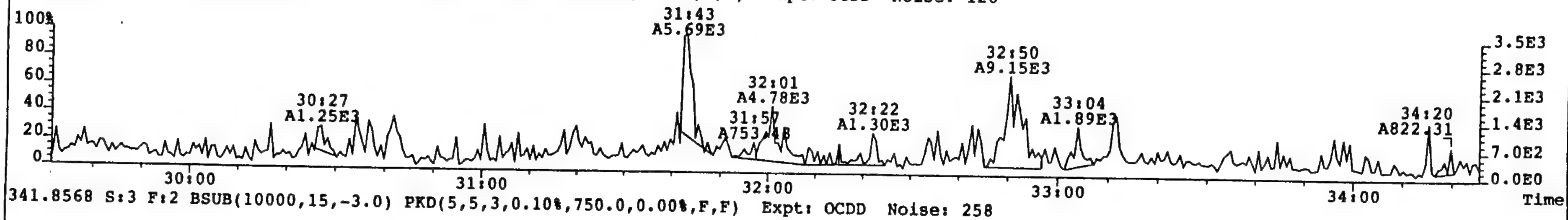
File: 010214P1 Acq: 14-FEB-2001 12:49:16 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 3 Text: 0_275_MB001 Vial# 77 File Text: AAP DB5
303.9016 S:3 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 111



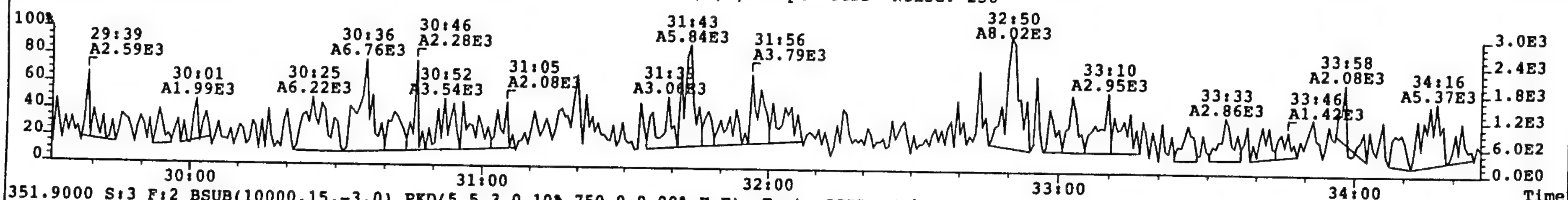
File: 010214P1 Acq: 14-FEB-2001 12:49:16 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 3 Text: 0_275_MB001 Vial# 77 File Text: AAP DB5
339.8597 S:3 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 71



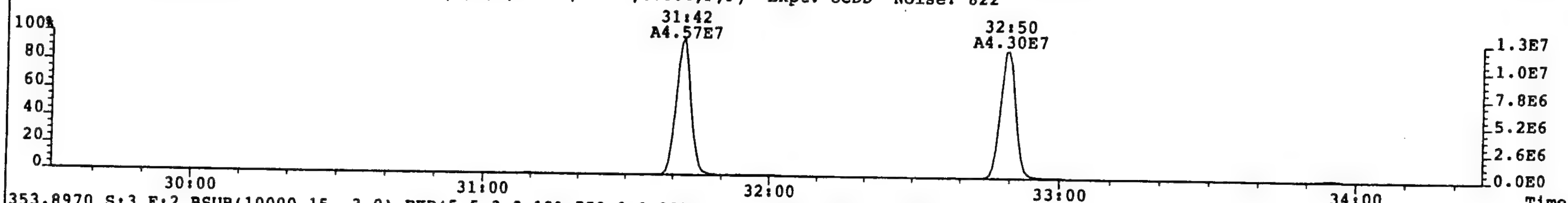
File: 010214P1 Acq: 14-FEB-2001 12:49:16 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 3 Text: 0_275_MB001 Vial# 77 File Text: AAP DB5
339.8597 S:3 F:2 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 126



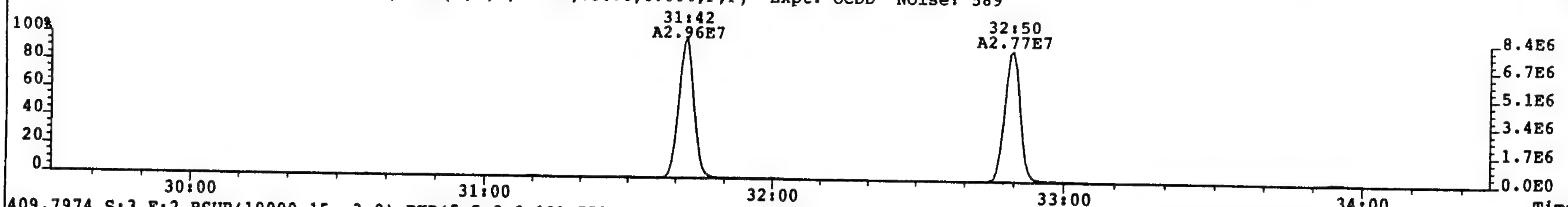
341.8568 S:3 F:2 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 258



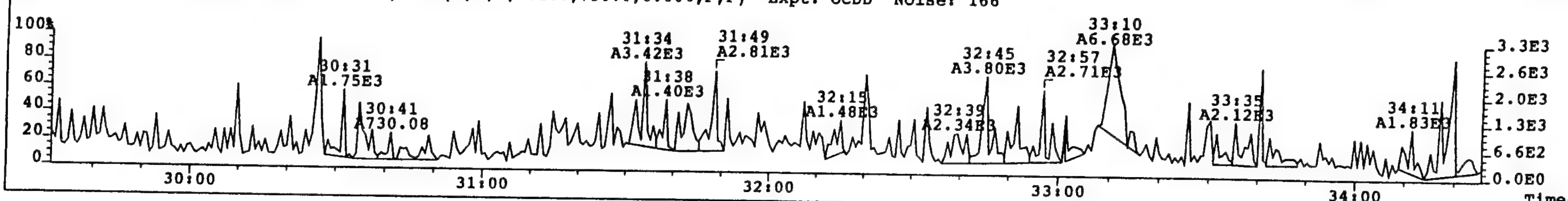
351.9000 S:3 F:2 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 822



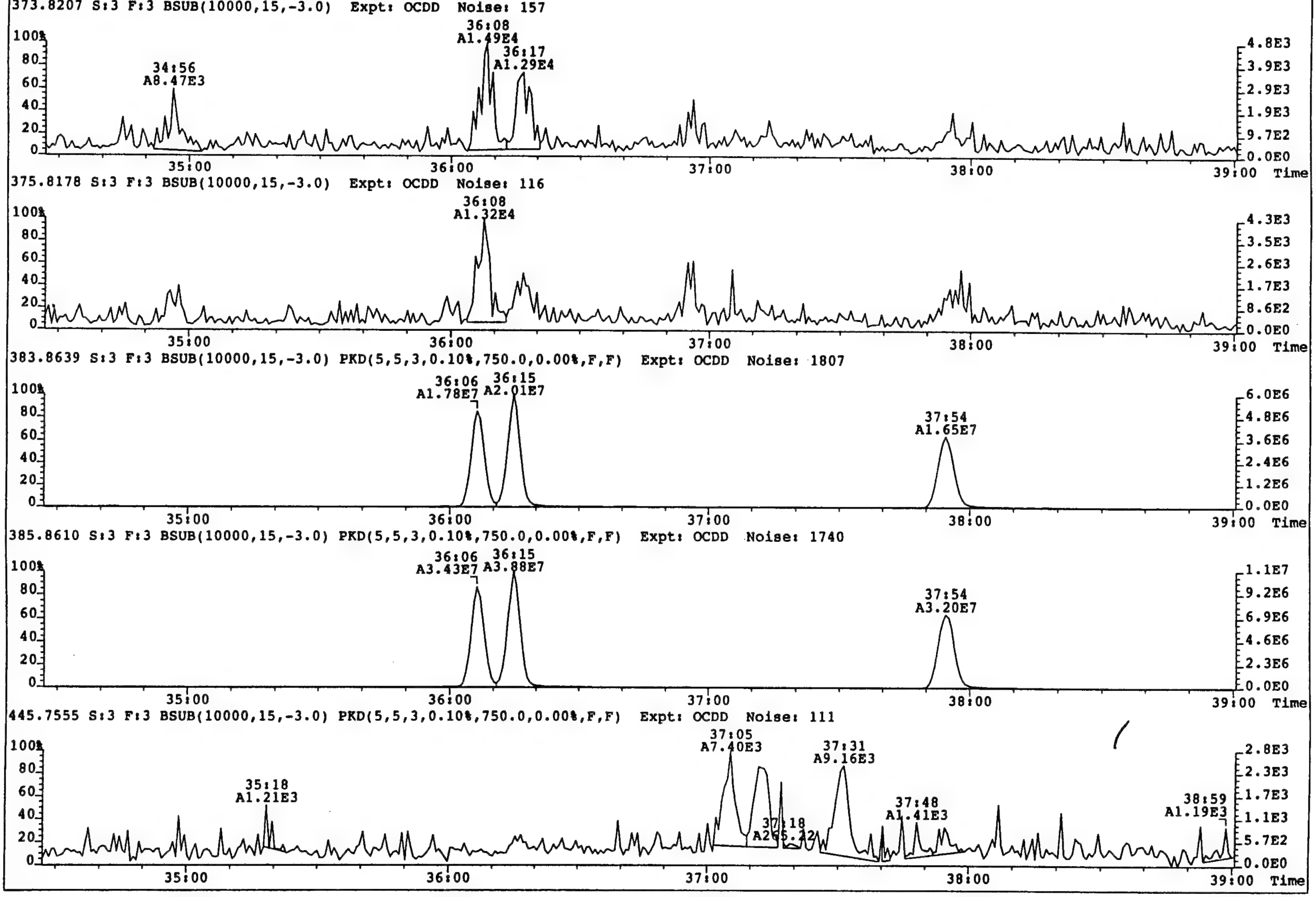
353.8970 S:3 F:2 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 589



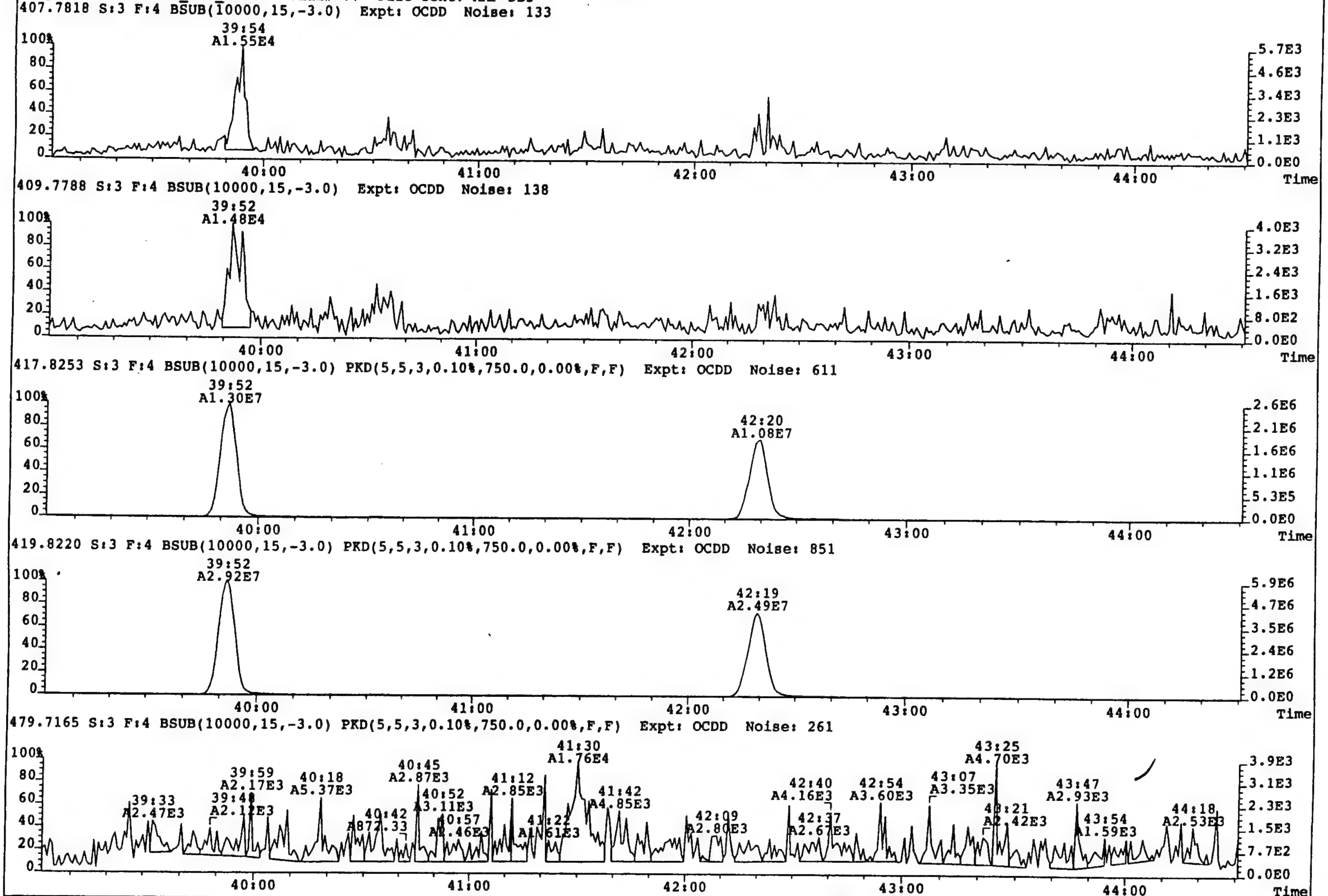
409.7974 S:3 F:2 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 166



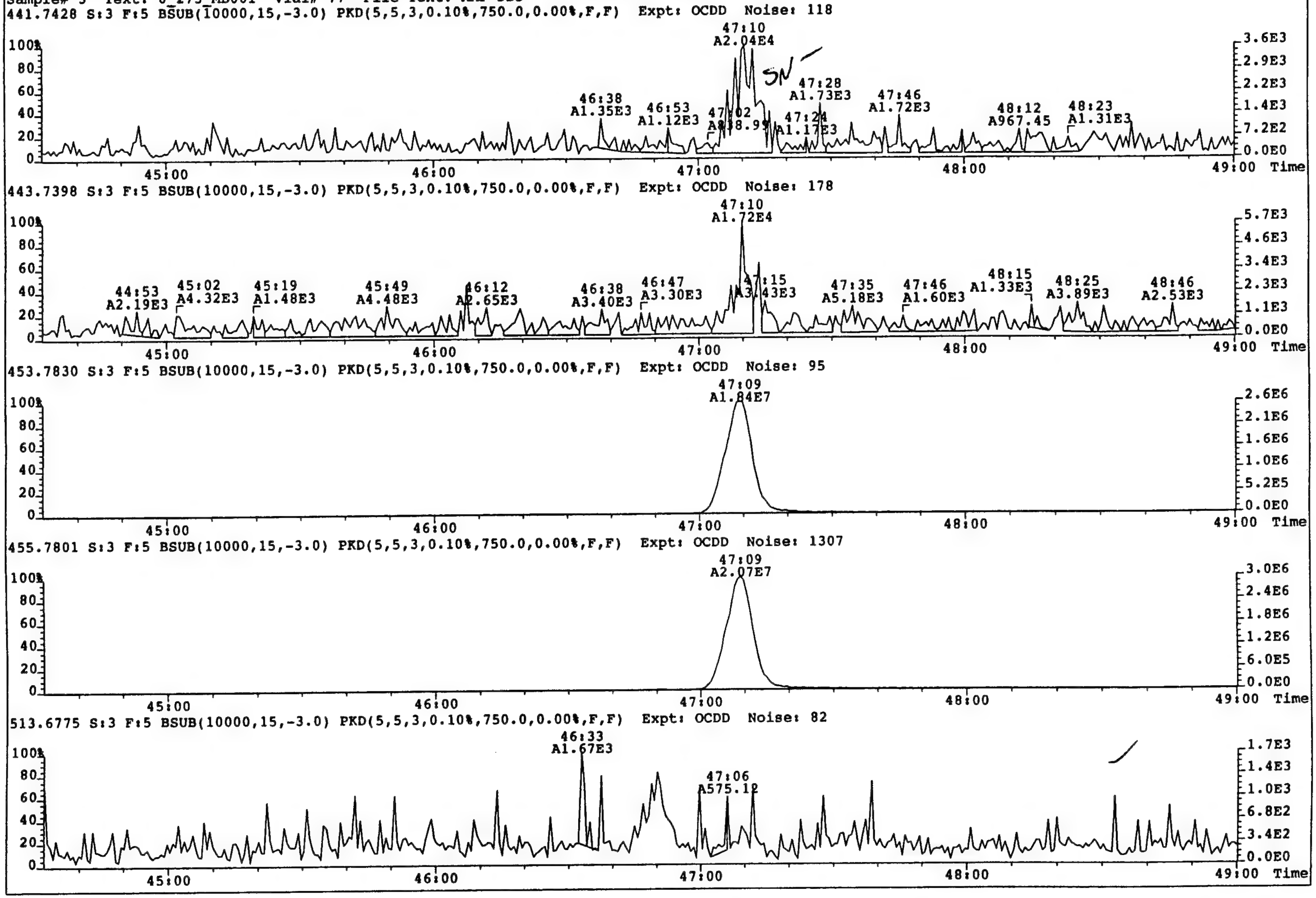
File: 010214P1 Acq: 14-FEB-2001 12:49:16 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 3 Text: 0_275_MB001 Vial# 77 File Text: AAP DB5



File: 010214P1 Acq: 14-FEB-2001 12:49:16 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 3 Text: 0_275_MB001 Vial# 77 File Text: AAP DB5



File: 010214P1 Acq: 14-FEB-2001 12:49:16 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 3 Text: 0_275_MB001 Vial# 77 File Text: AAP DB5



Sample ID: M23-1

Method M23

Client Data		**Sample Data**		**Laboratory Data**			
Name:	PES	Matrix:	Air	Project No.:	P1388	Date Received:	6-Feb-01
Project ID:	F181.001	Weight/Volume:	1	Sample ID:	P1388_275_001CU	Date Extracted:	8-Feb-01
Date Collected:	31-Jan-01			QC Batch No.:	275	Date Analyzed:	23-FEB-01

Analyte	Conc.	DL	EMPC	Qualifier	Recoveries		
	pg	pg	pg		IS	SS	AS
2,3,7,8-TCDD	ND	0.792			102	96.5	97.9
1,2,3,7,8-PeCDD	EMPC		1.74	A	99.7	93.1	97.9
1,2,3,4,7,8-HxCDD	4.56			A	104	91.1	97.9
1,2,3,6,7,8-HxCDD	7.58			A	104	91.1	97.9
1,2,3,7,8,9-HxCDD	4.64			A	104	91.1	97.9
1,2,3,4,6,7,8-HpCDD	27.3			A B	96.5	90.3	97.9
OCDD	74.4			A B	83.6	90.3	97.9
2,3,7,8-TCDF	11.3				100	96.5	97.9
1,2,3,7,8-PeCDF	20.9			A	91.1	93.1	97.9
2,3,4,7,8-PeCDF	46.6			A	91.1	93.1	97.9
1,2,3,4,7,8-HxCDF	48.9			A B	90.7	96.9	97.9
1,2,3,6,7,8-HxCDF	54.6				90.7	96.9	97.9
2,3,4,6,7,8-HxCDF	87.3				90.7	96.9	97.9
1,2,3,7,8,9-HxCDF	13.7			A	90.7	96.9	97.9
1,2,3,4,6,7,8-HpCDF	234			B	86	90.3	97.9
1,2,3,4,7,8,9-HpCDF	26.5			A	86	90.3	97.9
OCDF	145				81.3	90.3	97.9
Totals & TEQs							
TCDDs	17.3						
PeCDDs	41.3		48.5				
HxCDDs	68.2						
HpCDDs	55.6						
TCDFs	345		370				
PeCDFs	451		456				
HxCDFs	517						
HpCDFs	370						
Total PCDD/Fs	**2090**		**2120**				
TEQ (ND=0)	**50.7**		**51.5**	**ITEF**			
TEQ (ND=DL/2)	**51.1**		**51.9**	**ITEF**			

ALTA ANALYTICAL PERSPECTIVES

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Reviewer Cl
Date 25 Feb 01

Client ID: M23-1 CU
Lab ID: P1388_275_001CU

Filename: 010223P1 S: 3 Acq: 23-FEB-01 13:01:16
GC Column ID: db-5 ICal: MM1_M23_0: wt/vol: 1.000

ConCal: 010223P1-
EndCal: 010223P1-

	Name	Resp	RA	RRF	RT	Conc	Qualif.	CDE	noise	Fac	DL	EMPC
	2,3,7,8-TCDD	*	* n	1.26	NotF:	*			1110	2.5	0.792	
	1,2,3,7,8-PeCDD	2.93e+04	2.02 n	1.01	33:13	1.74			1185	2.5	1.70	
	1,2,3,4,7,8-HxCDD	7.04e+04	1.38 y	1.14	37:01	4.56			967	2.5	1.30	
	1,2,3,6,7,8-HxCDD	1.05e+05	1.33 y	1.02	37:08	7.58			967	2.5	1.45	
	1,2,3,7,8,9-HxCDD	7.20e+04	1.31 y	1.14	37:28	4.64			967	2.5	1.30	
	1,2,3,4,6,7,8-HpCDD	3.76e+05	1.09 y	1.13	41:26	27.3			1220	2.5	2.16	
	OCDD	6.54e+05	0.92 y	1.03	46:45	74.4			885	2.5	2.92	
	2,3,7,8-TCDF	3.09e+05	0.69 y	1.05	26:48	11.3			1564	2.5	1.11	
	1,2,3,7,8-PeCDF	4.68e+05	1.49 y	1.04	31:39	20.9			1856	2.5	1.95	
	2,3,4,7,8-PeCDF	1.06e+06	1.55 y	1.05	32:46	46.6			1856	2.5	1.92	
	1,2,3,4,7,8-HxCDF	8.99e+05	1.18 y	1.13	36:03	48.9			1260	2.5	0.919	
	1,2,3,6,7,8-HxCDF	1.10e+06	1.25 y	1.24	36:11	54.6			1260	2.5	0.840	
	2,3,4,6,7,8-HxCDF	1.65e+06	1.20 y	1.16	36:51	87.3			1260	2.5	0.893	
	1,2,3,7,8,9-HxCDF	2.27e+05	1.34 y	1.02	37:53	13.7			1260	2.5	1.02	
	1,2,3,4,6,7,8-HpCDF	3.91e+06	1.01 y	1.54	39:48	234			1208	2.5	1.11	
	1,2,3,4,7,8,9-HpCDF	3.74e+05	1.04 y	1.30	42:15	26.5			1208	2.5	1.32	
	OCDF	1.54e+06	0.89 y	1.15	47:04	145			1327	2.5	3.40	
	Total Tetra-Dioxins	4.54e+05	0.79 y	1.26	23:58	17.3			1110	2.5	0.792	17.3
	Total Penta-Dioxins	6.97e+05	1.60 y	1.01	30:36	41.3			1185	2.5	1.70	48.5
	Total Hexa-Dioxins	1.02e+06	1.31 y	1.10	35:19	68.2			967	2.5	1.35	68.2
	Total Hepta-Dioxins	7.67e+05	1.03 y	1.13	40:15	55.6			1220	2.5	2.16	55.6
	Total Tetra-Furans	9.46e+06	0.72 y	1.05	21:46	345			1564	2.5	1.11	370
	1st Fnc. Penta-Furans	1.06e+06	1.64 y	1.05	28:50	46.8			4180	2.5	4.35	46.8
	Total Penta-Furans	9.14e+06	1.51 y	1.05	30:22	405			1856	2.5	1.93	
	PeCDF Totals:					451						456
	Total Hexa-Furans	9.66e+06	1.20 y	1.14	34:40	517			1260	2.5	0.914	517
	Total Hepta-Furans	5.97e+06	1.01 y	1.42	39:48	370			1208	2.5	1.20	370
												Rec
IS	13C-2,3,7,8-TCDD	6.67e+07	0.80 y	1.13	27:41	3250						102
IS	13C-1,2,3,7,8-PeCDD	5.34e+07	1.57 y	0.93	33:06	3190						99.7
IS	13C-1,2,3,6,7,8-HxCDD	4.34e+07	1.25 y	0.93	37:08	3320						104
IS	13C-1,2,3,4,6,7,8-HpCDD	3.91e+07	1.04 y	0.91	41:25	3090						96.5
IS	13C-OCDD	2.74e+07	0.89 y	0.73	46:44	2680						83.6
IS	13C-2,3,7,8-TCDF	8.39e+07	0.79 y	1.06	26:48	3200						100
IS	13C-1,2,3,7,8-PeCDF	6.91e+07	1.56 y	0.96	31:38	2920						91.1
IS	13C-1,2,3,6,7,8-HxCDF	5.20e+07	0.52 y	1.28	36:10	2900						90.7
IS	13C-1,2,3,4,6,7,8-HpCDF	3.47e+07	0.44 y	0.90	39:47	2750						86.0
IS	13C-OCDF	2.95e+07	0.88 y	0.81	47:03	2600						81.3
RS/RT	13C-1,2,3,4-TCDD	5.78e+07	0.79 y	1.00	27:01	3200						-
RS	13C-1,2,3,4-TCDF	7.91e+07	0.78 y	1.00	25:25	3200						-
RS/RT	13C-1,2,3,7,8,9-HxCDD	4.47e+07	1.25 y	1.00	37:26	3200						-
PS	37Cl-2,3,7,8-TCDD	3.31e+07		0.51	27:42	3090						96.5
PS	13C-2,3,4,7,8-PeCDF	6.26e+07	1.58 y	0.97	32:45	2980						93.1
PS	13C-1,2,3,4,7,8-HxCDD	3.64e+07	1.25 y	0.92	37:00	2910						91.1
PS	13C-1,2,3,4,7,8-HxCDF	4.59e+07	0.51 y	0.91	36:02	3100						96.9
PS	13C-1,2,3,4,7,8,9-HpCDF	2.68e+07	0.43 y	0.85	42:14	2890						90.3
AS	13C-1,2,3,7,8,9-HxCDF	4.68e+07	0.52 y	1.07	37:50	3130						97.9

Reviewer: Ce

Date: 25 Feb 01

Analyst: GAG

Date: 24Feb01

Totals class: TCDD EMPC Function: 1 Run #: 16
File Name: 010223P1 Sample #: 3 Sample text: P1388_275_001 M23-1 Air Train CU

Acquired: 23-FEB-01 13:01:16 Processed: 23-FEB-01 14:56:00

Total Conc.: 17.275 Unnamed Conc.: 17.275

RT	m1 Resp	mod.	m2 Resp	mod.	RA		Resp	Adj_Resp	S/N		Conc.	Name
23:58	5.749e+04	y	7.279e+04	y	0.79	y	1.303e+05	1.303e+05	1.40e+01	y	4.96	
24:20	3.290e+04	y	4.072e+04	y	0.81	y	7.361e+04	7.361e+04	7.55e+00	y	2.80	
24:46	2.128e+04	y	3.106e+04	y	0.69	y	5.234e+04	5.234e+04	6.00e+00	y	1.99	
25:50	4.864e+04	y	5.857e+04	y	0.83	y	1.072e+05	1.072e+05	9.81e+00	y	4.08	
27:25	3.946e+04	y	5.103e+04	y	0.77	y	9.049e+04	9.049e+04	8.18e+00	y	3.44	

Totals class: PeCDD EMPC Function: 2 Run #: 16
File Name: 010223P1 Sample #: 3 Sample text: P1388_275_001 M23-1 Air Train CU

Acquired: 23-FEB-01 13:01:16 Processed: 23-FEB-01 14:56:00

Total Conc.: 48.519 Unnamed Conc.: 46.781

RT	m1 Resp	mod.	m2 Resp	mod.	RA		Resp	Adj_Resp	S/N		Conc.	Name
30:36	1.324e+05	y	8.277e+04	y	1.60	y	2.151e+05	2.151e+05	1.49e+01	y	12.7	
31:08	2.218e+04	y	1.291e+04	y	1.72	y	3.509e+04	3.509e+04	3.23e+00	y	2.08	
31:41	9.365e+04	y	5.601e+04	y	1.67	y	1.497e+05	1.497e+05	1.30e+01	y	8.86	
31:52	2.066e+04	y	1.711e+04	y	1.21	n	3.777e+04	3.398e+04	5.06e+00	y	2.01	
31:59	5.095e+04	y	3.112e+04	y	1.64	y	8.208e+04	8.208e+04	9.15e+00	y	4.86	
32:14	5.054e+04	y	3.510e+04	y	1.44	y	8.564e+04	8.564e+04	6.62e+00	y	5.07	
32:37	4.816e+04	n	3.418e+04	y	1.41	y	8.235e+04	8.235e+04	8.90e+00	y	4.88	
33:07	3.585e+04	y	2.776e+04	y	1.29	n	6.362e+04	5.899e+04	7.53e+00	y	3.49	
33:13	2.321e+04	y	1.151e+04	y	2.02	n	3.472e+04	2.935e+04	3.02e+00	y	1.74	1,2,3,7,8-PeCDD
33:34	2.919e+04	y	1.782e+04	y	1.64	y	4.702e+04	4.702e+04	4.04e+00	y	2.78	

Totals class: HxCDD EMPC Function: 3 Run #: 16
File Name: 010223P1 Sample #: 3 Sample text: P1388_275_001 M23-1 Air Train CU

Acquired: 23-FEB-01 13:01:16 Processed: 23-FEB-01 14:56:00

Total Conc.: 68.237 Unnamed Conc.: 51.453

RT	m1 Resp	mod.	m2 Resp	mod.	RA		Resp	Adj_Resp	S/N		Conc.	Name
35:19	7.959e+04	n	6.088e+04	n	1.31	y	1.405e+05	1.405e+05	1.71e+01	y	9.41	
35:58	1.502e+05	y	1.132e+05	y	1.33	y	2.634e+05	2.634e+05	3.42e+01	y	17.6	
36:16	1.388e+05	y	1.118e+05	y	1.24	y	2.506e+05	2.506e+05	2.64e+01	y	16.8	
36:23	2.866e+04	y	2.107e+04	y	1.36	y	4.973e+04	4.973e+04	7.59e+00	y	3.33	
37:01	4.088e+04	y	2.953e+04	y	1.38	y	7.041e+04	7.041e+04	1.07e+01	y	4.56	1,2,3,4,7,8-HxCDD

37:08	6.002e+04	y	4.510e+04	y	1.33	y	1.051e+05	1.051e+05	1.19e+01	y	7.58	1,2,3,6,7,8-HxCDD
37:21	3.341e+04	y	3.075e+04	y	1.09	y	6.416e+04	6.416e+04	8.25e+00	y	4.30	
37:28	4.083e+04	n	3.114e+04	y	1.31	y	7.197e+04	7.197e+04	7.91e+00	y	4.64	1,2,3,7,8,9-HxCDD

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Totals class: HpCDD EMPC Function: 4 Run #: 16
File Name: 010223P1 Sample #: 3 Sample text: P1388_275_001 M23-1 Air Train CU

Acquired: 23-FEB-01 13:01:16 Processed: 23-FEB-01 14:56:00

Total Conc.: 55.576 Unnamed Conc.: 28.312

RT	m1 Resp	mod.	m2 Resp	mod.	RA		Resp	Adj_Resp	S/N		Conc.	Name
40:15	1.979e+05	n	1.927e+05	n	1.03	y	3.906e+05	3.906e+05	3.19e+01	y	28.3	
41:26	1.957e+05	n	1.804e+05	n	1.09	y	3.761e+05	3.761e+05	3.05e+01	y	27.3	1,2,3,4,6,7,8-HpCDD

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Totals class: TCDF EMPC Function: 1 Run #: 16
File Name: 010223P1 Sample #: 3 Sample text: P1388_275_001 M23-1 Air Train CU

Acquired: 23-FEB-01 13:01:16 Processed: 23-FEB-01 14:56:00

Total Conc.: 369.52 Unnamed Conc.: 358.236

RT	m1 Resp	mod.	m2 Resp	mod.	RA		Resp	Adj_Resp	S/N		Conc.	Name
21:46	1.185e+05	n	1.653e+05	n	0.72	y	2.838e+05	2.838e+05	1.82e+01	y	10.3	
22:21	9.414e+04	n	1.250e+05	n	0.75	y	2.192e+05	2.192e+05	1.39e+01	y	7.99	
23:01	1.592e+05	n	2.202e+05	n	0.72	y	3.794e+05	3.794e+05	2.68e+01	y	13.8	
23:32	4.850e+05	y	6.572e+05	y	0.74	y	1.142e+06	1.142e+06	4.51e+01	y	41.7	
23:55	3.308e+05	y	4.326e+05	y	0.76	y	7.634e+05	7.634e+05	3.18e+01	y	27.8	
24:21	1.655e+05	y	1.998e+05	y	0.83	y	3.653e+05	3.653e+05	2.57e+01	y	13.3	
24:30	7.081e+04	y	1.107e+05	y	0.64	n	1.815e+05	1.628e+05	1.40e+01	y	5.94	
24:40	1.038e+05	y	1.364e+05	y	0.76	y	2.402e+05	2.402e+05	1.81e+01	y	8.76	
25:03	1.299e+05	y	1.760e+05	y	0.74	y	3.059e+05	3.059e+05	2.33e+01	y	11.2	
25:11	2.686e+05	y	3.484e+05	y	0.77	y	6.170e+05	6.170e+05	4.65e+01	y	22.5	
25:25	7.666e+05	y	1.007e+06	y	0.76	y	1.774e+06	1.774e+06	8.16e+01	y	64.7	
25:54	1.564e+05	y	2.080e+05	y	0.75	y	3.644e+05	3.644e+05	2.77e+01	y	13.3	
26:01	2.236e+04	y	3.275e+04	y	0.68	y	5.511e+04	5.511e+04	6.19e+00	y	2.01	
26:11	1.167e+05	y	1.654e+05	y	0.71	y	2.821e+05	2.821e+05	2.33e+01	y	10.3	
26:23	2.310e+05	n	3.303e+05	y	0.70	y	5.612e+05	5.612e+05	4.07e+01	y	20.5	
26:35	2.698e+05	y	3.392e+05	y	0.80	y	6.090e+05	6.090e+05	4.75e+01	y	22.2	
26:42	1.953e+05	y	3.041e+05	y	0.64	n	4.994e+05	4.489e+05	4.43e+01	y	16.4	
26:48	1.266e+05	y	1.827e+05	y	0.69	y	3.093e+05	3.093e+05	2.51e+01	y	11.3	2,3,7,8-TCDF
27:11	4.434e+05	n	6.020e+05	n	0.74	y	1.045e+06	1.045e+06	8.82e+01	y	38.1	
27:26	2.648e+04	y	4.648e+04	y	0.57	n	7.297e+04	6.088e+04	6.01e+00	y	2.22	
27:43	3.046e+04	n	3.847e+04	y	0.79	y	6.894e+04	6.894e+04	5.35e+00	y	2.51	
28:51	3.107e+04	y	4.395e+04	n	0.71	y	7.502e+04	7.502e+04	6.48e+00	y	2.74	

Page 12 of 18

Totals class: 1st Fnc.PeCDF EMPC Function: 1 Run #: 16
File Name: 010223P1 Sample #: 3 Sample text: P1388_275_001 M23-1 Air Train CU

Acquired: 23-FEB-01 13:01:16 Processed: 23-FEB-01 14:56:00

Total Conc.: 46.757 Unnamed Conc.: 46.757

RT	m1 Resp	mod.	m2 Resp	mod.	RA		Resp	Adj_Resp	S/N		Conc.	Name
28:50	6.559e+05	n	3.996e+05	n	1.64	y	1.055e+06	1.055e+06	2.00e+01	y	46.8	

Totals class: PeCDF EMPC Function: 2 Run #: 16
File Name: 010223P1 Sample #: 3 Sample text: P1388_275_001 M23-1 Air Train CU

Acquired: 23-FEB-01 13:01:16 Processed: 23-FEB-01 14:56:00

Total Conc.: 409.15 Unnamed Conc.: 341.683

RT	m1 Resp	mod.	m2 Resp	mod.	RA		Resp	Adj_Resp	S/N		Conc.	Name
30:22	7.295e+05	y	4.825e+05	y	1.51	y	1.212e+06	1.212e+06	1.00e+00	n	53.7	
30:31	7.874e+05	y	5.026e+05	y	1.57	y	1.290e+06	1.290e+06	9.67e-01	n	57.1	
30:38	1.972e+05	y	1.316e+05	y	1.50	y	3.288e+05	3.288e+05	3.49e-01	n	14.6	
30:44	6.448e+04	y	4.067e+04	y	1.59	y	1.051e+05	1.051e+05	1.23e-01	n	4.66	
30:58	1.158e+05	y	7.743e+04	y	1.50	y	1.933e+05	1.933e+05	1.83e-01	n	8.56	
31:07	1.859e+05	y	1.270e+05	y	1.46	y	3.129e+05	3.129e+05	4.36e-01	n	13.9	
31:13	8.298e+05	y	5.571e+05	y	1.49	y	1.387e+06	1.387e+06	1.04e+00	n	61.4	
31:27	1.904e+05	n	1.274e+05	n	1.50	y	3.178e+05	3.178e+05	3.71e-01	n	14.1	
31:39	2.803e+05	n	1.882e+05	y	1.49	y	4.685e+05	4.685e+05	2.89e+01	y	20.9	1,2,3,7,8-PeCDF
31:56	5.285e+05	n	3.629e+05	n	1.46	y	8.914e+05	8.914e+05	6.52e-01	n	39.5	
32:30	5.696e+04	y	3.548e+04	y	1.61	y	9.243e+04	9.243e+04	1.18e-01	n	4.09	
32:39	8.356e+05	n	5.586e+05	y	1.50	y	1.394e+06	1.394e+06	1.57e+00	n	61.8	
32:46	6.440e+05	y	4.151e+05	y	1.55	y	1.059e+06	1.059e+06	5.69e+01	y	46.6	2,3,4,7,8-PeCDF
33:06	6.309e+04	y	4.942e+04	y	1.28	n	1.125e+05	1.038e+05	1.21e-01	n	4.60	
33:51	4.986e+04	y	3.472e+04	y	1.44	y	8.458e+04	8.458e+04	1.03e-01	n	3.75	

Totals class: HxCDF EMPC Function: 3 Run #: 16
File Name: 010223P1 Sample #: 3 Sample text: P1388_275_001 M23-1 Air Train CU

Acquired: 23-FEB-01 13:01:16 Processed: 23-FEB-01 14:56:00

Total Conc.: 517.26 Unnamed Conc.: 312.763

RT	m1 Resp	mod.	m2 Resp	mod.	RA		Resp	Adj_Resp	S/N		Conc.	Name
34:40	5.164e+05	n	4.299e+05	n	1.20	y	9.463e+05	9.463e+05	9.80e+01	y	51.1	
34:52	1.285e+06	n	1.082e+06	n	1.19	y	2.367e+06	2.367e+06	2.55e+02	y	128	
35:06	1.202e+05	n	1.012e+05	n	1.19	y	2.214e+05	2.214e+05	2.20e+01	y	12.0	
35:17	1.753e+05	n	1.393e+05	n	1.26	y	3.146e+05	3.146e+05	3.36e+01	y	17.0	
35:30	8.724e+04	n	6.709e+04	n	1.30	y	1.543e+05	1.543e+05	1.58e+01	y	8.34	
35:56	6.400e+05	n	5.010e+05	n	1.28	y	1.141e+06	1.141e+06	1.19e+02	y	61.7	
36:03	4.868e+05	n	4.120e+05	n	1.18	y	8.988e+05	8.988e+05	9.07e+01	y	48.9	1,2,3,4,7,8-HxCDF
36:11	6.100e+05	n	4.891e+05	n	1.25	y	1.099e+06	1.099e+06	1.10e+02	y	54.6	1,2,3,6,7,8-HxCDF
36:21	1.094e+05	n	8.865e+04	n	1.23	y	1.981e+05	1.981e+05	2.22e+01	y	10.7	

36:29	1.290e+05	n	1.086e+05	n	1.19	y	2.376e+05	2.376e+05	2.30e+01	y	12.8	
36:37	1.190e+05	n	8.713e+04	n	1.37	y	2.061e+05	2.061e+05	1.85e+01	y	11.1	
36:51	9.000e+05	n	7.522e+05	n	1.20	y	1.652e+06	1.652e+06	1.67e+02	y	87.3	2,3,4,6,7,8-HxCDF
37:53	1.302e+05	n	9.724e+04	n	1.34	y	2.274e+05	2.274e+05	1.60e+01	y	13.7	1,2,3,7,8,9-HxCDF

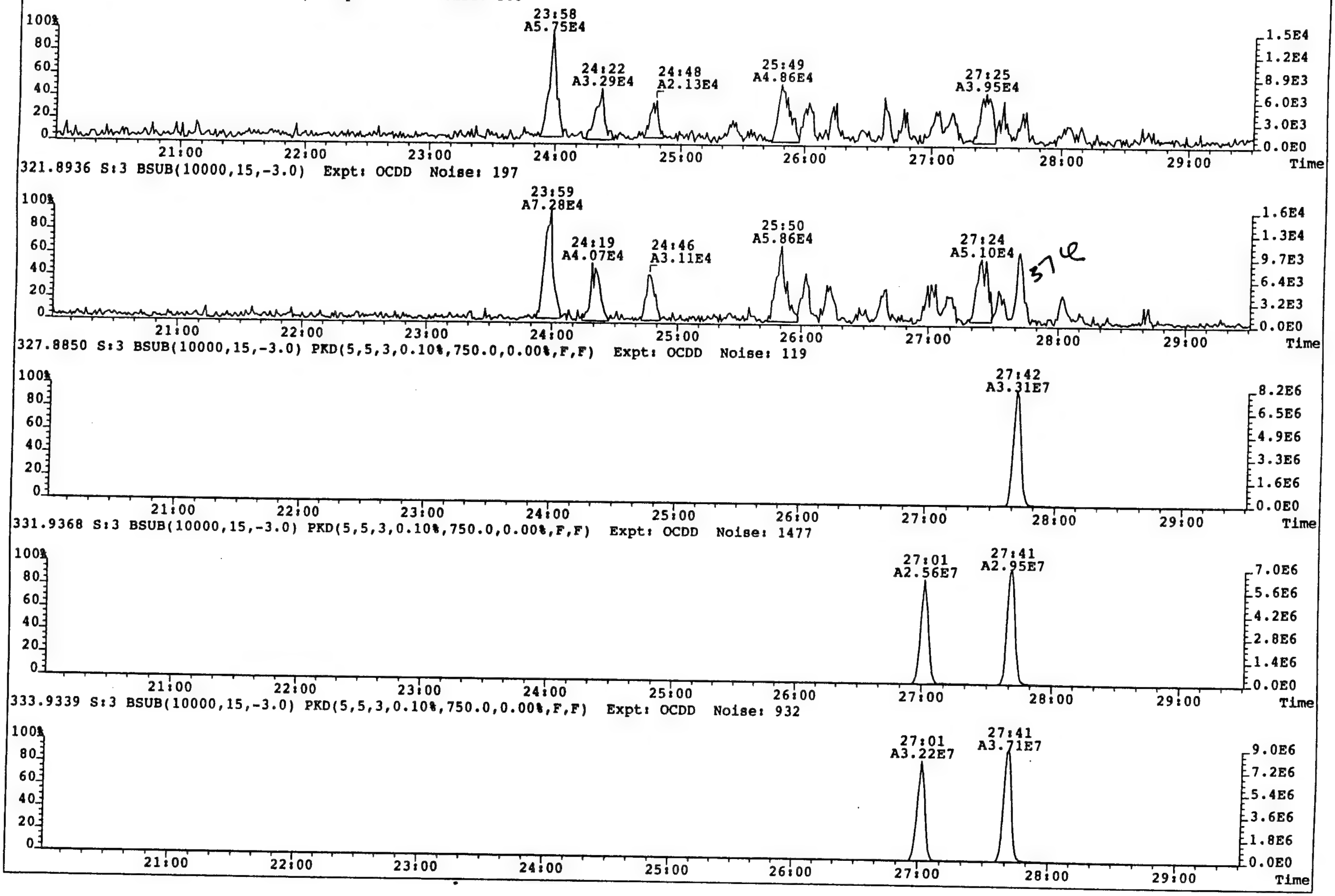
Totals class: HpCDF EMPC Function: 4 Run #: 16
File Name: 010223P1 Sample #: 3 Sample text: P1388_275_001 M23-1 Air Train CU

Acquired: 23-FEB-01 13:01:16 Processed: 23-FEB-01 14:56:00

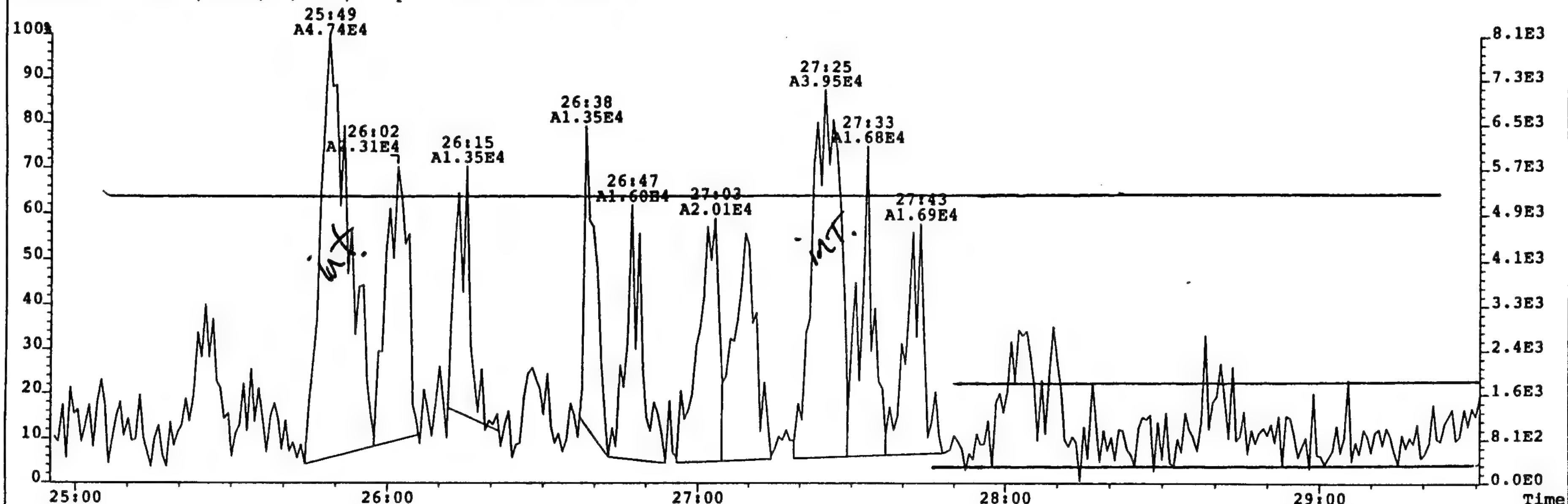
Total Conc.: 369.68 Unnamed Conc.: 109.495

RT	m1 Resp	mod.	m2 Resp	mod.	RA		Resp	Adj_Resp	S/N		Conc.	Name
39:48	1.962e+06	n	1.948e+06	n	1.01	y	3.911e+06	3.911e+06	3.57e+02	y	234	1,2,3,4,6,7,8-HpCDF
40:15	4.577e+05	n	4.686e+05	n	0.98	y	9.263e+05	9.263e+05	7.27e+01	y	60.1	
40:29	3.927e+05	n	3.693e+05	n	1.06	y	7.620e+05	7.620e+05	7.24e+01	y	49.4	
42:15	1.911e+05	n	1.832e+05	n	1.04	y	3.743e+05	3.743e+05	2.95e+01	y	26.5	1,2,3,4,7,8,9-HpCDF

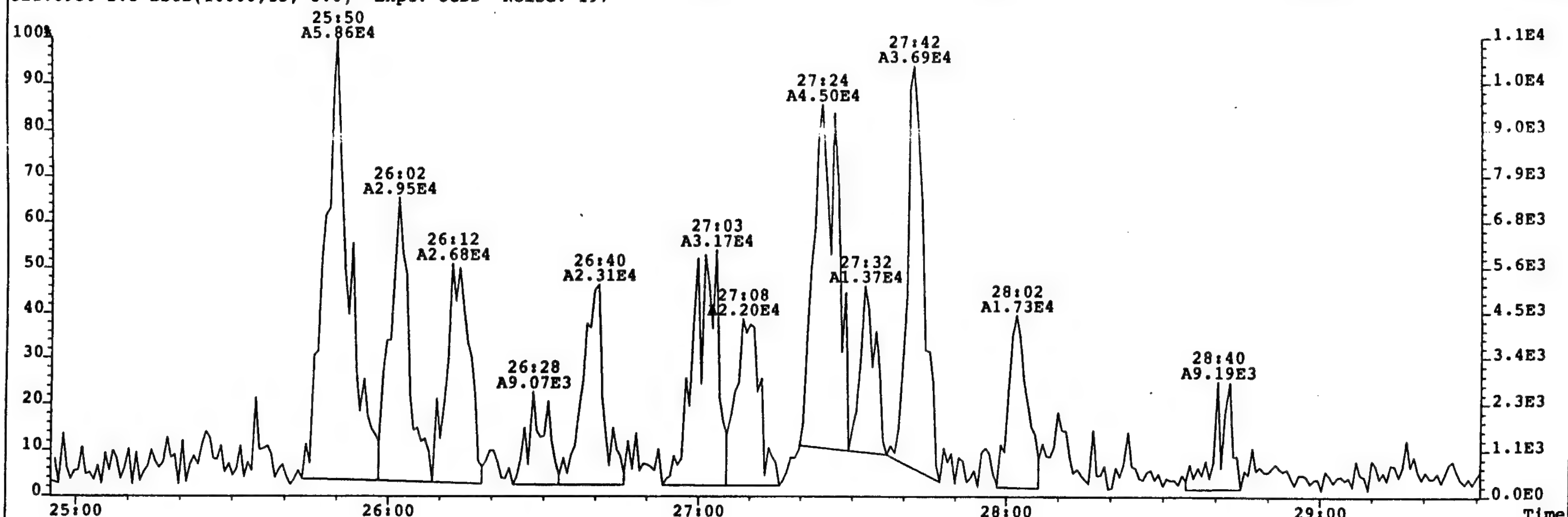
File: 010223P1 Acq: 23-FEB-2001 13:01:16 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 3 Text: P1388_275_001 M23-1 Air Train CU Vial# 65 File Text: AAP DB5
319.8965 S:3 BSUB(10000,15,-3.0) Expt: OCDD Noise: 300



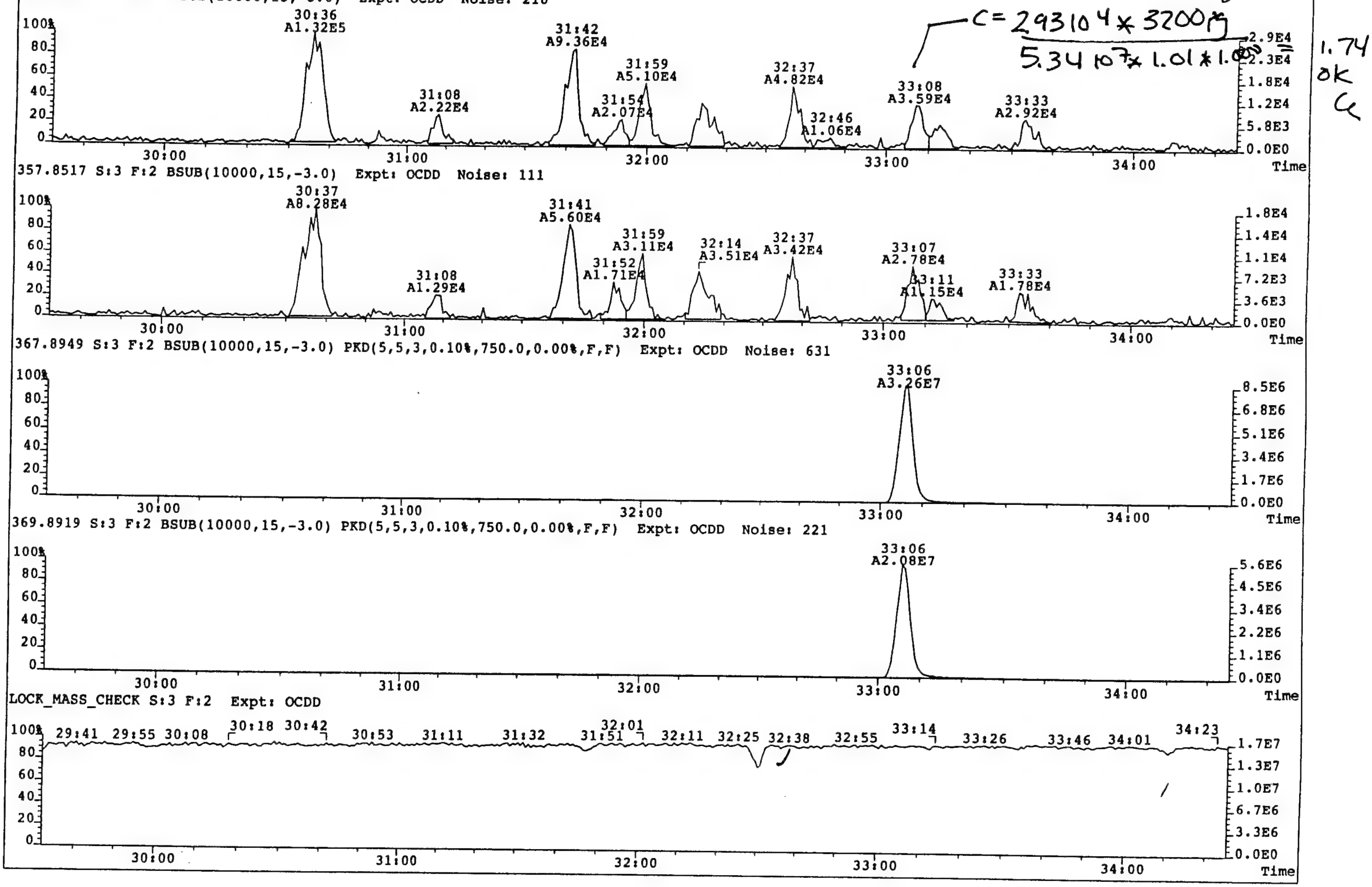
File: 010223P1 Acq: 23-FEB-2001 13:01:16 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 3 Text: P1388_275_001 M23-1 Air Train CU Vial# 65 File Text: AAP DB5
319.8965 S:3 BSUB(10000,15,-3.0) Expt: OCDD Noise: 300



321.8936 S:3 BSUB(10000,15,-3.0) Expt: OCDD Noise: 197

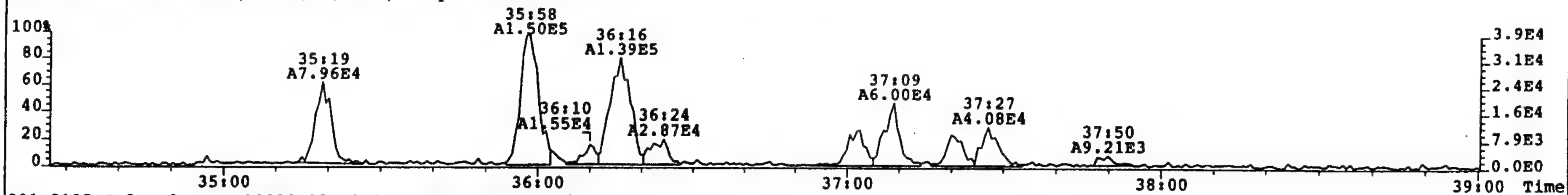


File: 010223P1 Acq: 23-FEB-2001 13:01:16 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 3 Text: P1388_275_001 M23-1 Air Train CU Vial# 65 File Text: AAP DB5

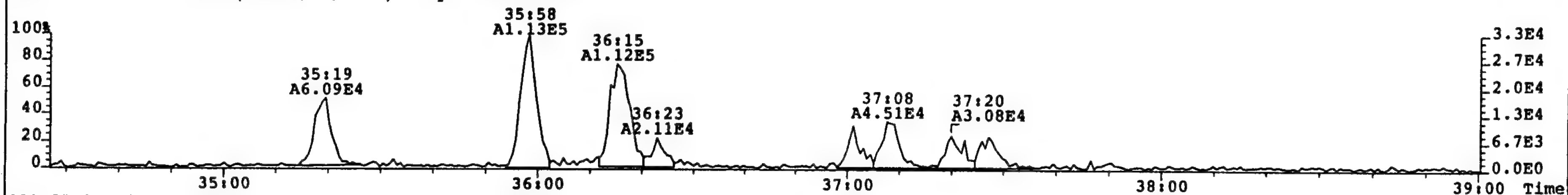


File: 010223P1 Acq: 23-FEB-2001 13:01:16 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 3 Text: P1388_275_001 M23-1 Air Train CU Vial# 65 File Text: AAP DB5

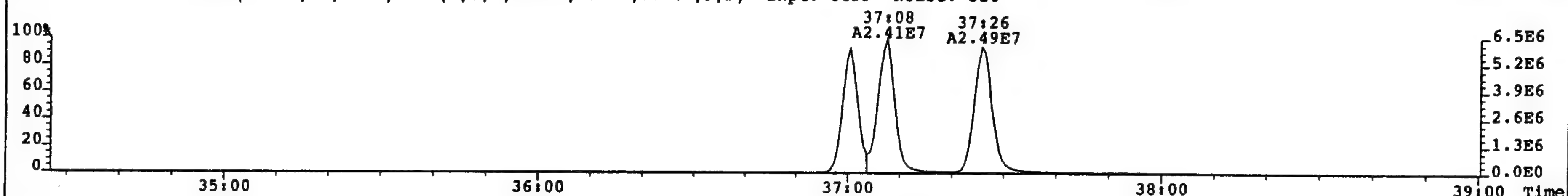
389.8156 S:3 F:3 BSUB(10000,15,-3.0) Expt: OCDD Noise: 315



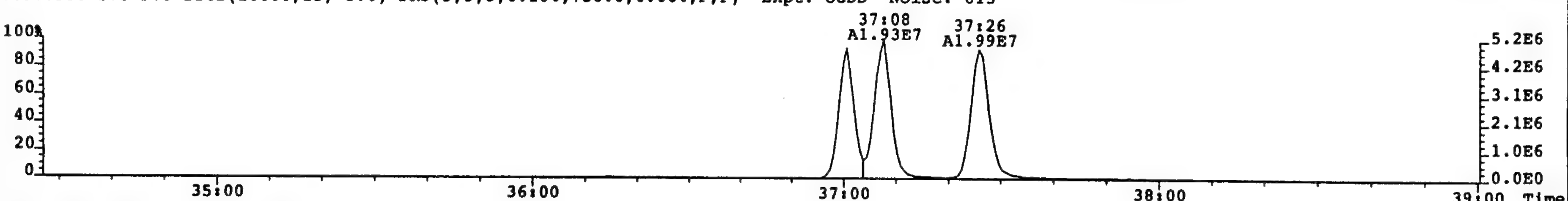
391.8127 S:3 F:3 BSUB(10000,15,-3.0) Expt: OCDD Noise: 223



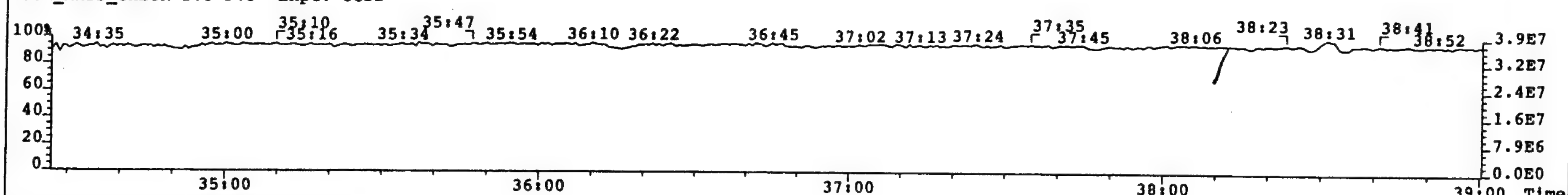
401.8559 S:3 F:3 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 520



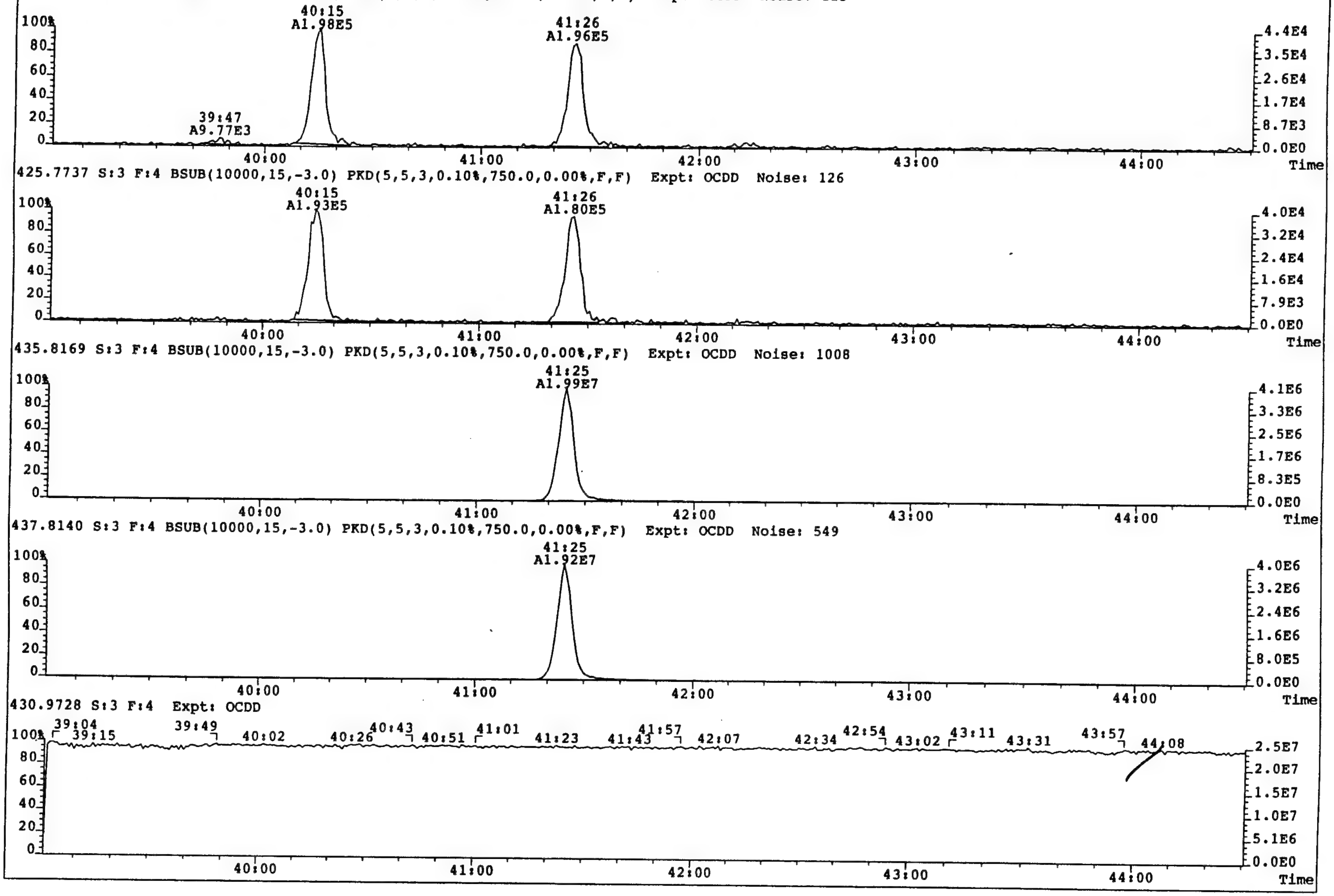
403.8530 S:3 F:3 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 615



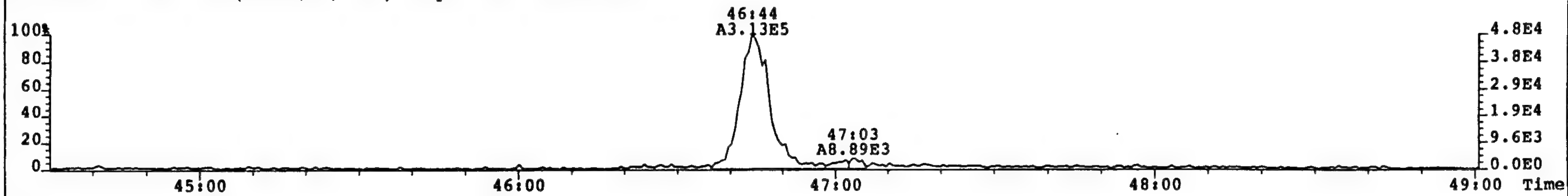
LOCK_MASS_CHECK S:3 F:3 Expt: OCDD



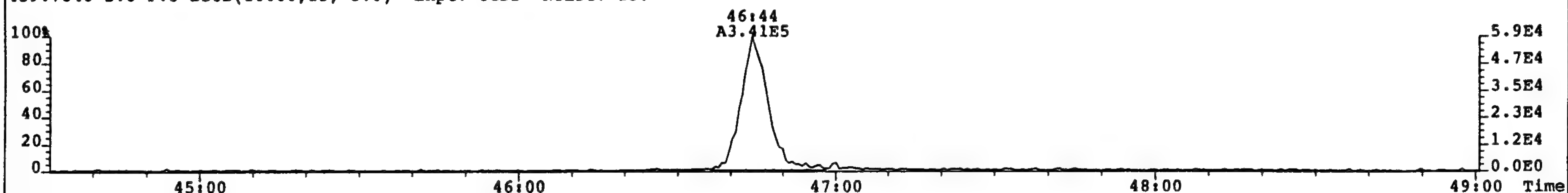
File: 010223P1 Acq: 23-FEB-2001 13:51:16 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 3 Text: P1388_275_001 M23-1 Air Train CU Vial# 65 File Text: AAP DB5
423.7767 S:3 F:4 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 115



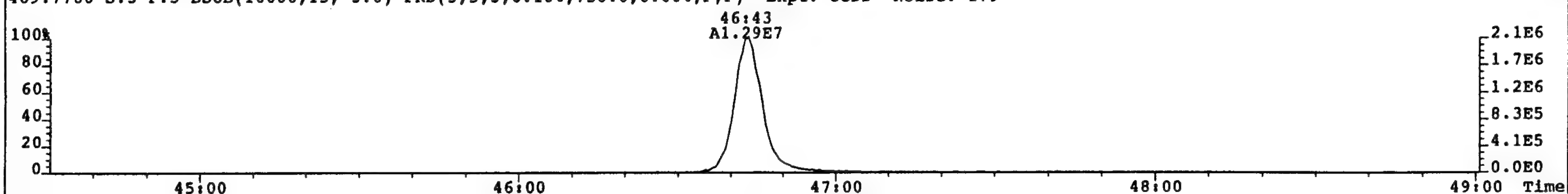
File: 010223P1 Acq: 23-FEB-2001 13:01:16 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 3 Text: P1388_275_001 M23-1 Air Train CU Vial# 65 File Text: AAP DB5
457.7377 S:3 F:5 BSUB(10000,15,-3.0) Expt: OCDD Noise: 211



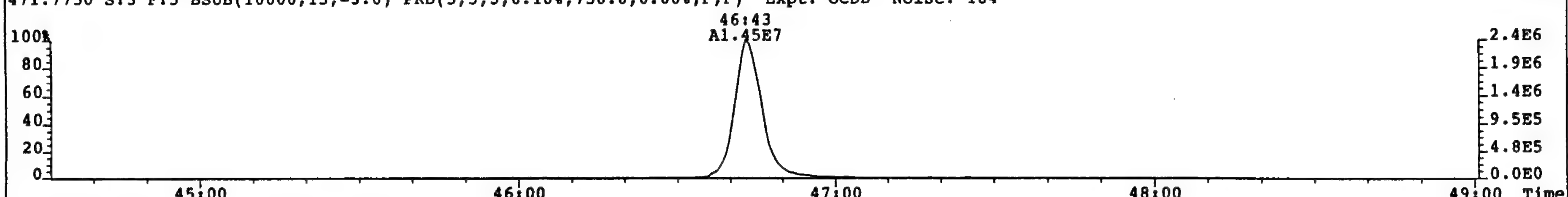
459.7348 S:3 F:5 BSUB(10000,15,-3.0) Expt: OCDD · Noise: 130



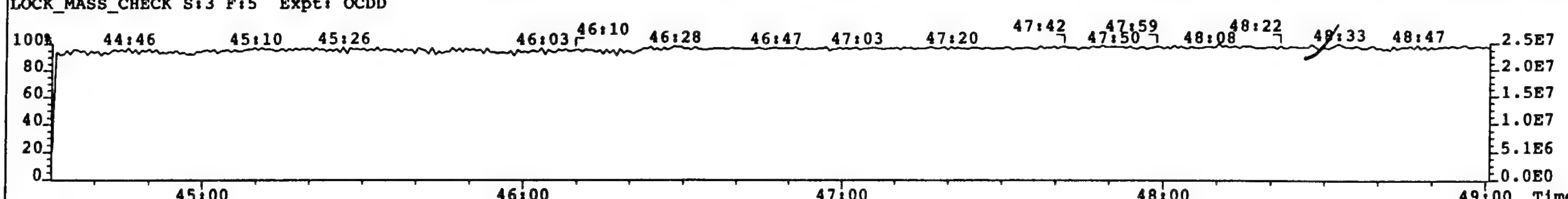
469.7780 S:3 F:5 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 179



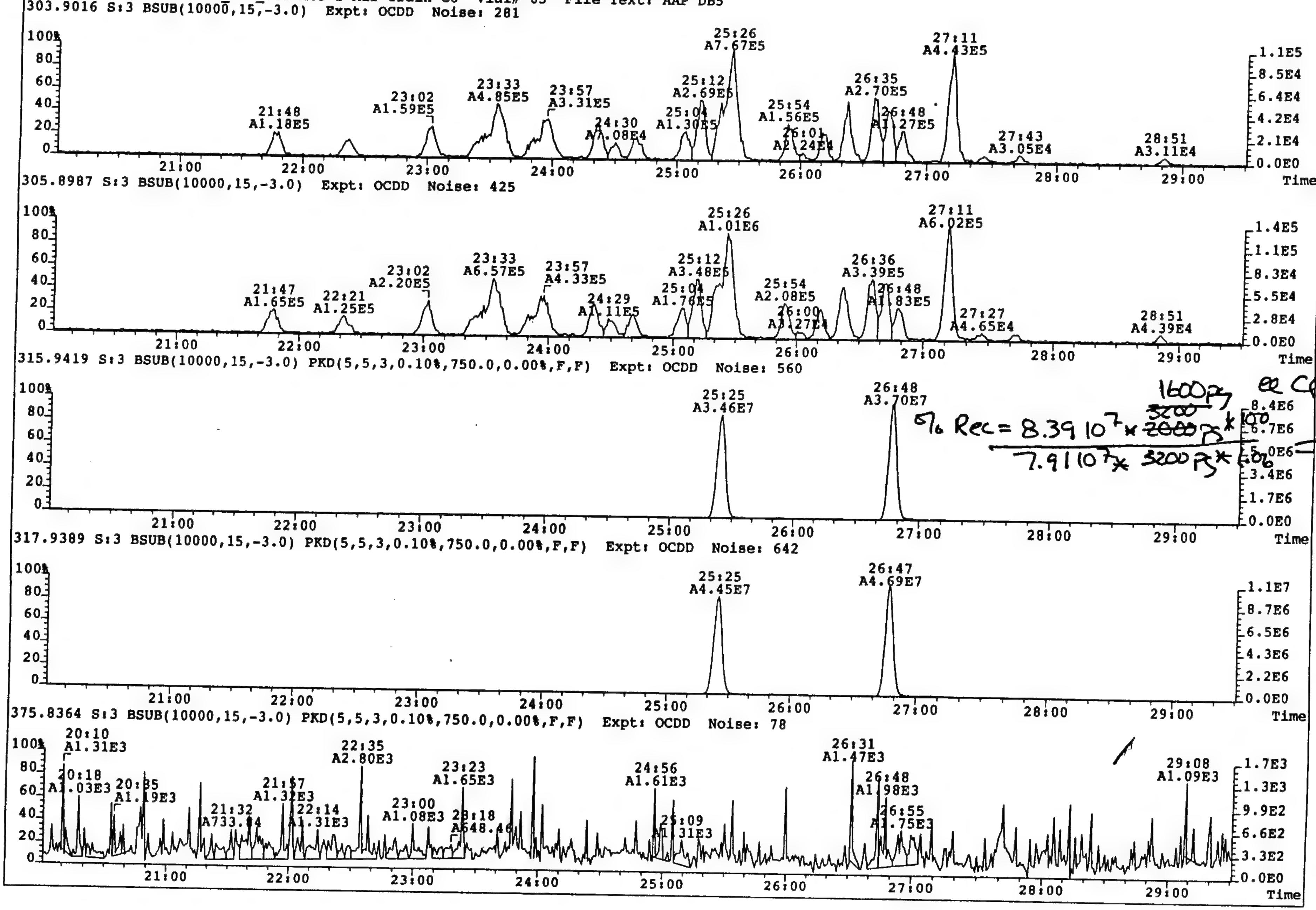
471.7750 S:3 F:5 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 184



LOCK_MASS_CHECK S:3 F:5 Expt: OCDD



File: 010223P1 Acq: 23-FEB-2001 13:01:16 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 3 Text: P1388_275_001 M23-1 Air Train CU Vial# 65 File Text: AAP DB5



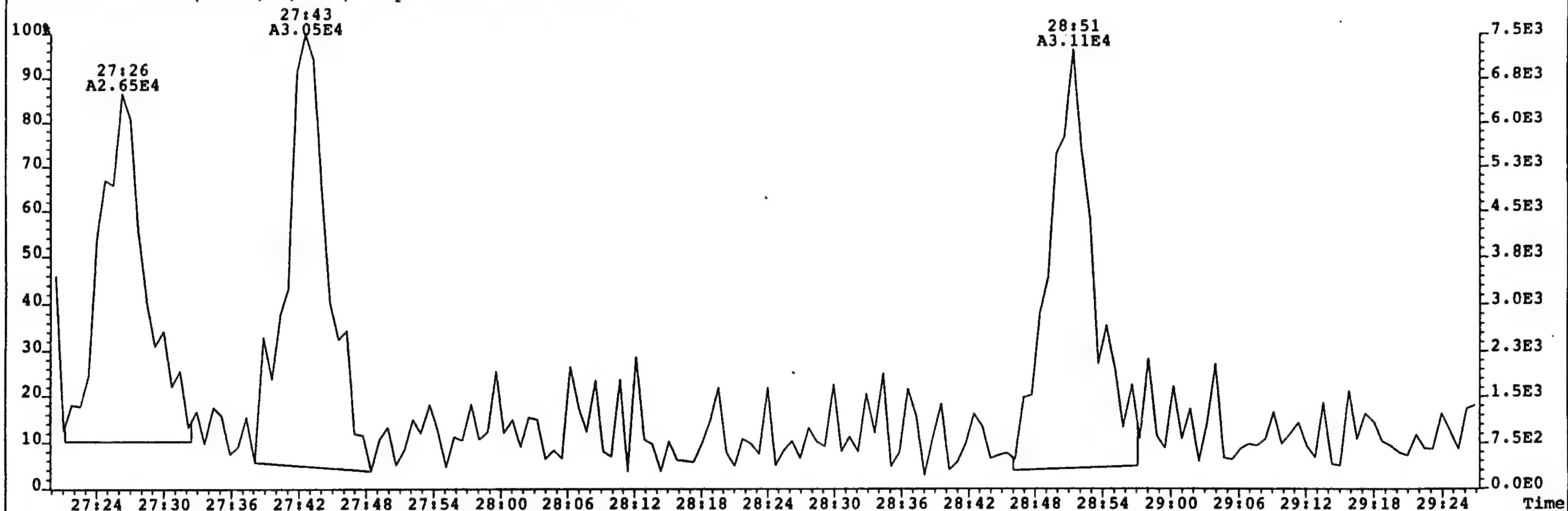
ee Cl

$$\% \text{ Rec} = \frac{8.39\,10^7 \times \cancel{2000}\ 3200\ 1600\text{pg} \times 100}{7.91\,10^7 \times 3200\text{pg} \times 1.06} = 100$$

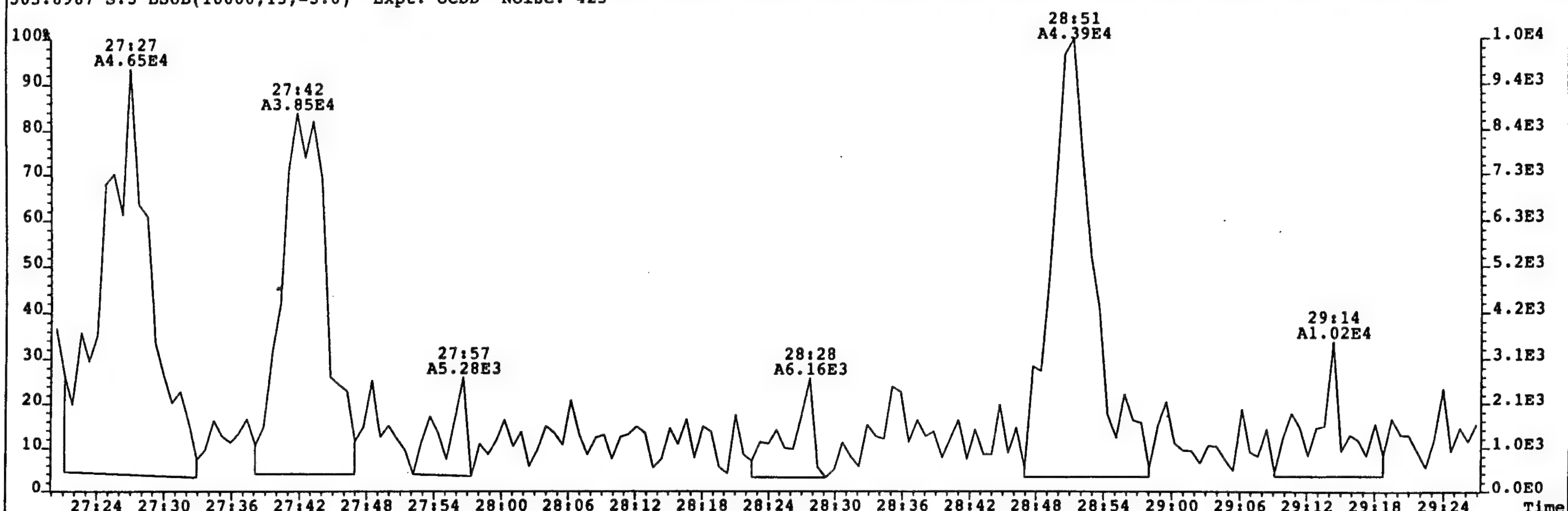
ok

Cl

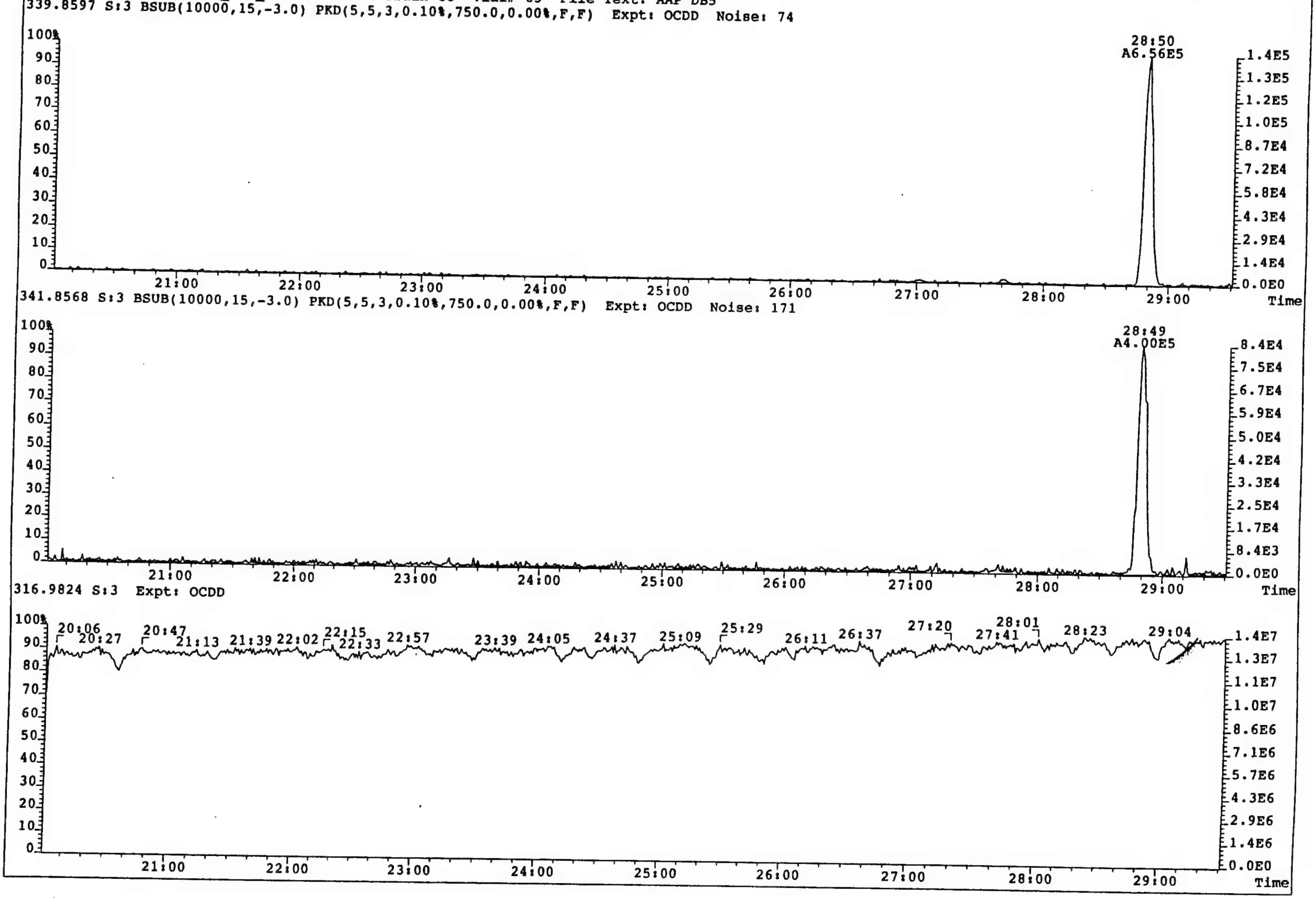
File: 010223P1 Acq: 23-FEB-2001 13:01:16 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 3 Text: P1388_275_001 M23-1 Air Train CU Vial# 65 File Text: AAP DB5
303.9016 S:3 BSUB(10000,15,-3.0) Expt: OCDD Noise: 281



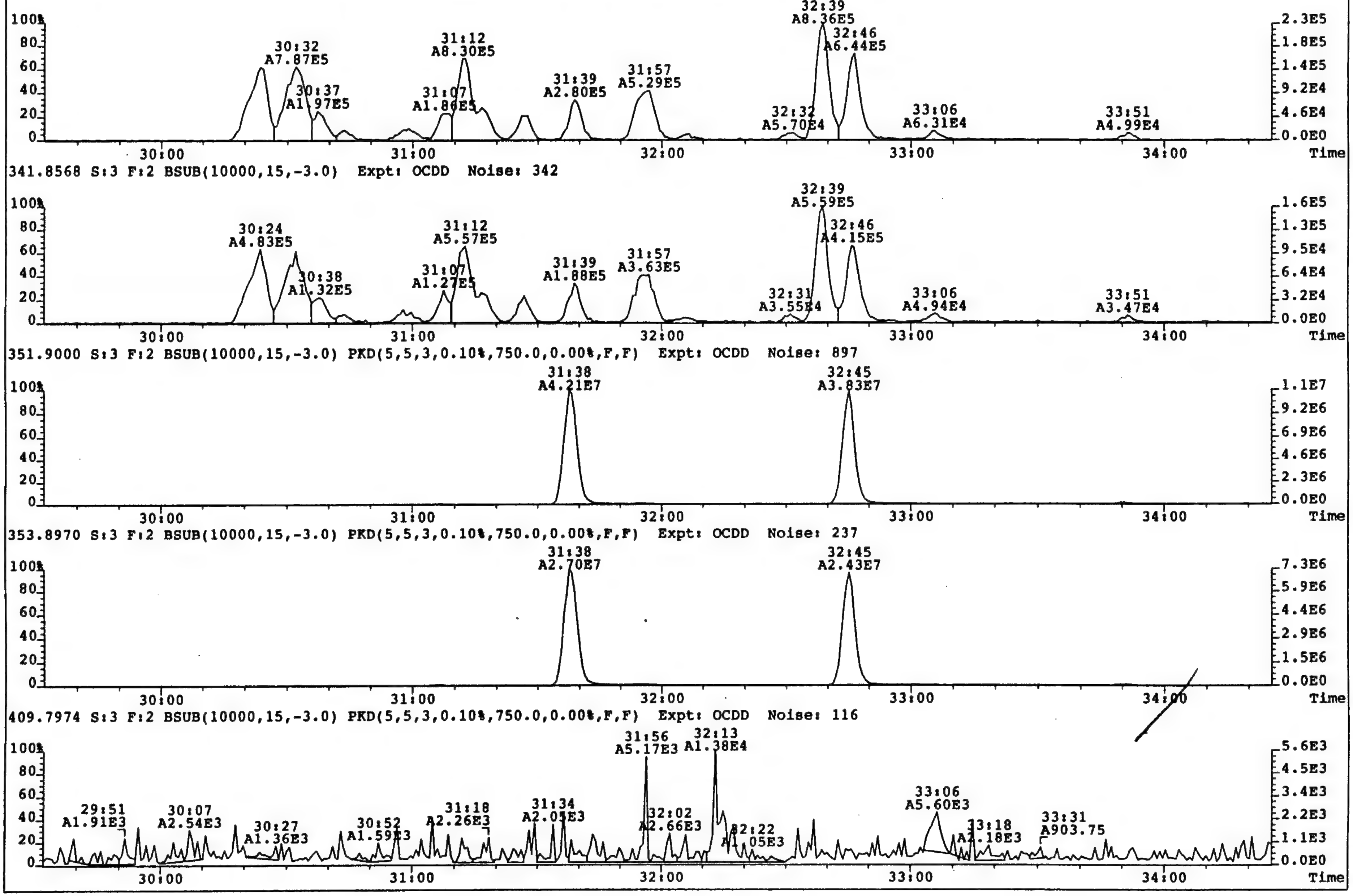
305.8987 S:3 BSUB(10000,15,-3.0) Expt: OCDD Noise: 425



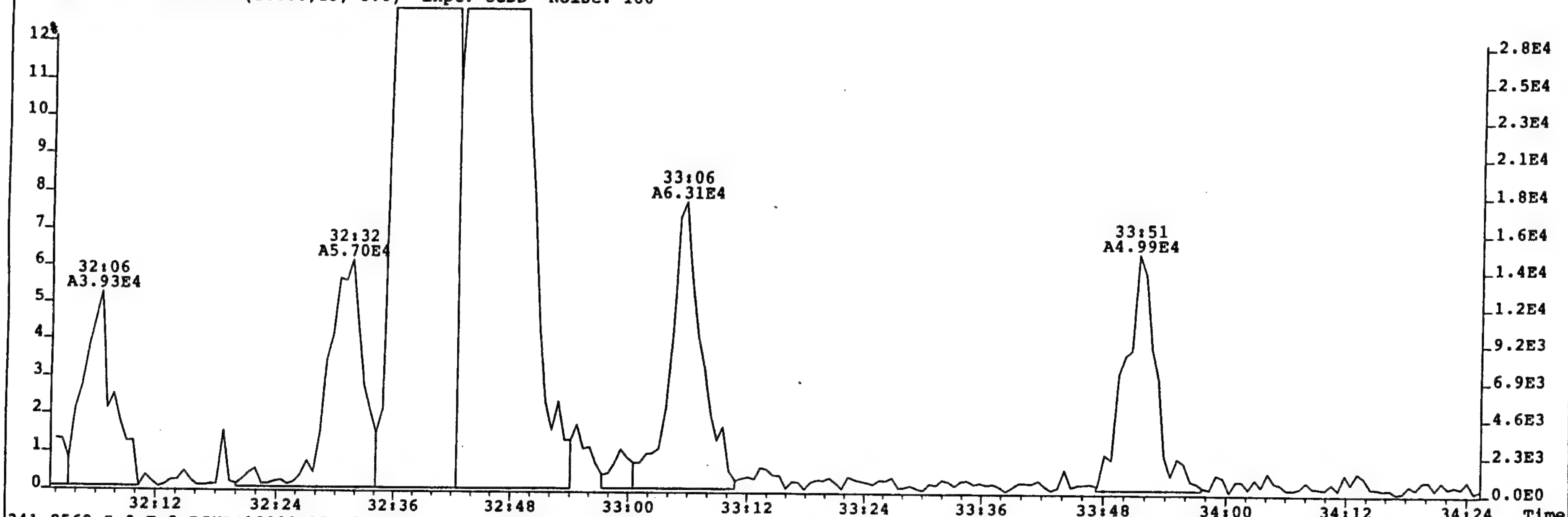
File: 010223P1 Acq: 23-FEB-2001 13:01:16 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 3 Text: P1388_275_001 M23-1 Air Train CU Vial# 65 File Text: AAP DB5



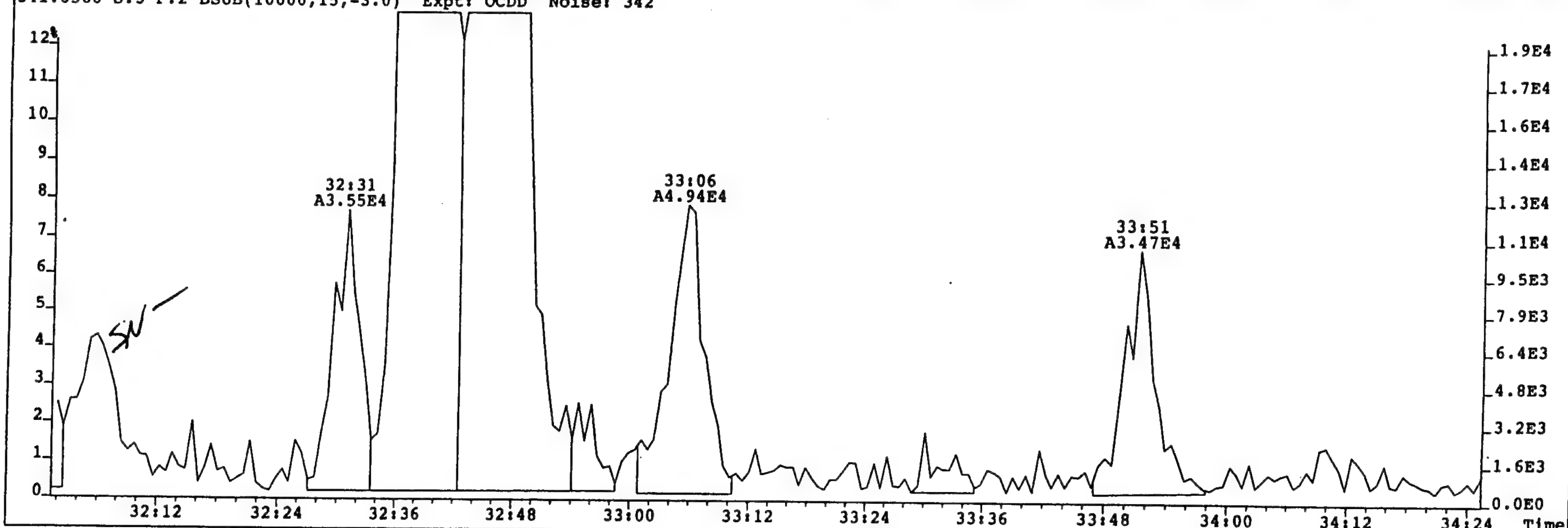
File: 010223P1 Acq: 23-FEB-2001 13:01:16 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 3 Text: P1388_275_001 M23-1 Air Train CU Vial# 65 File Text: AAP DB5
339.8597 S:3 F:2 BSUB(10000,15,-3.0) Expt: OCDD Noise: 160

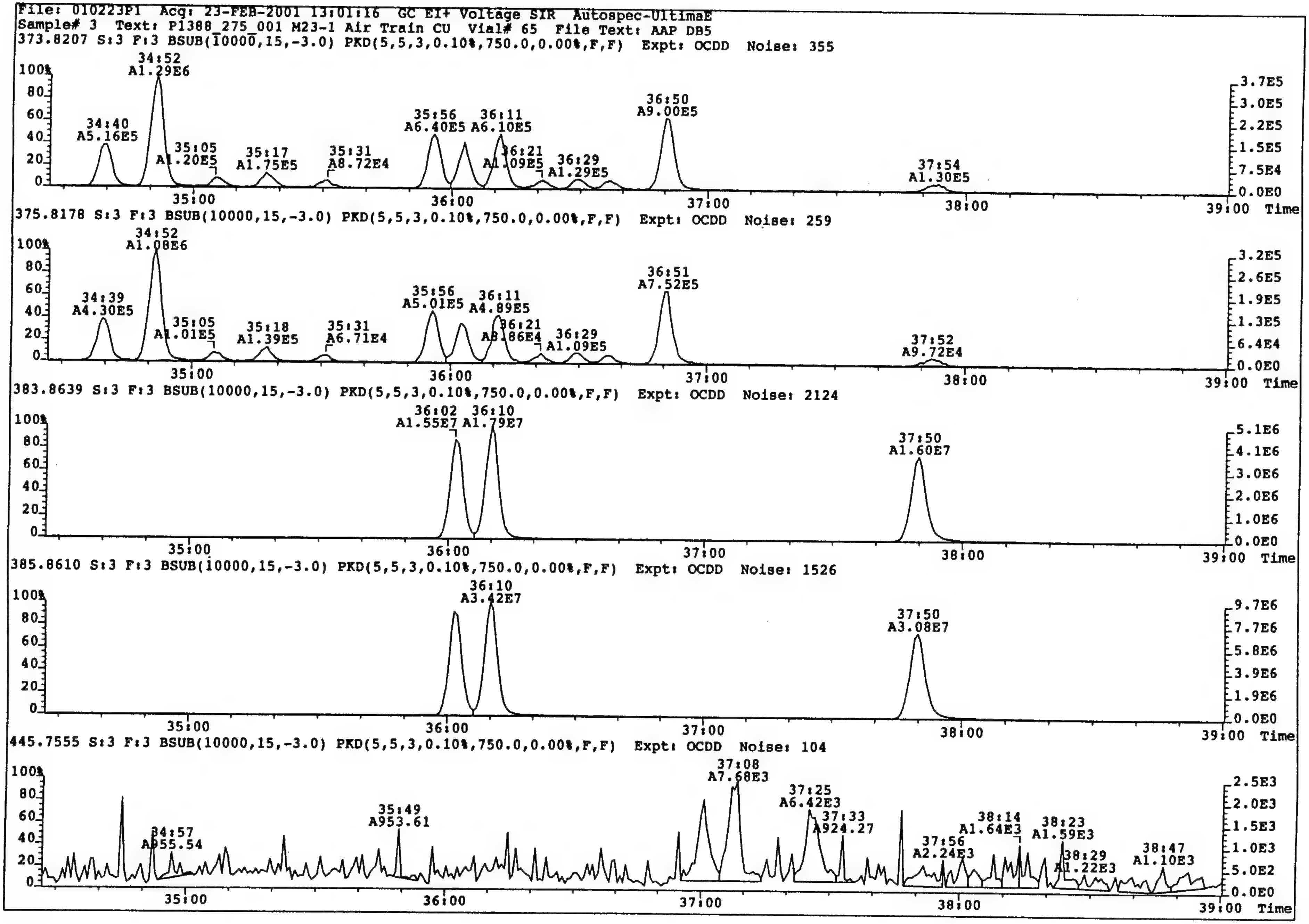


File: 010223P1 Acq: 23-FEB-2001 13:01:16 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 3 Text: P1388_275_001 M23-1 Air Train CU Vial# 65 File Text: AAP DB5
339.8597 S:3 F:2 BSUB(10000,15,-3.0) Expt: OCDD Noise: 160

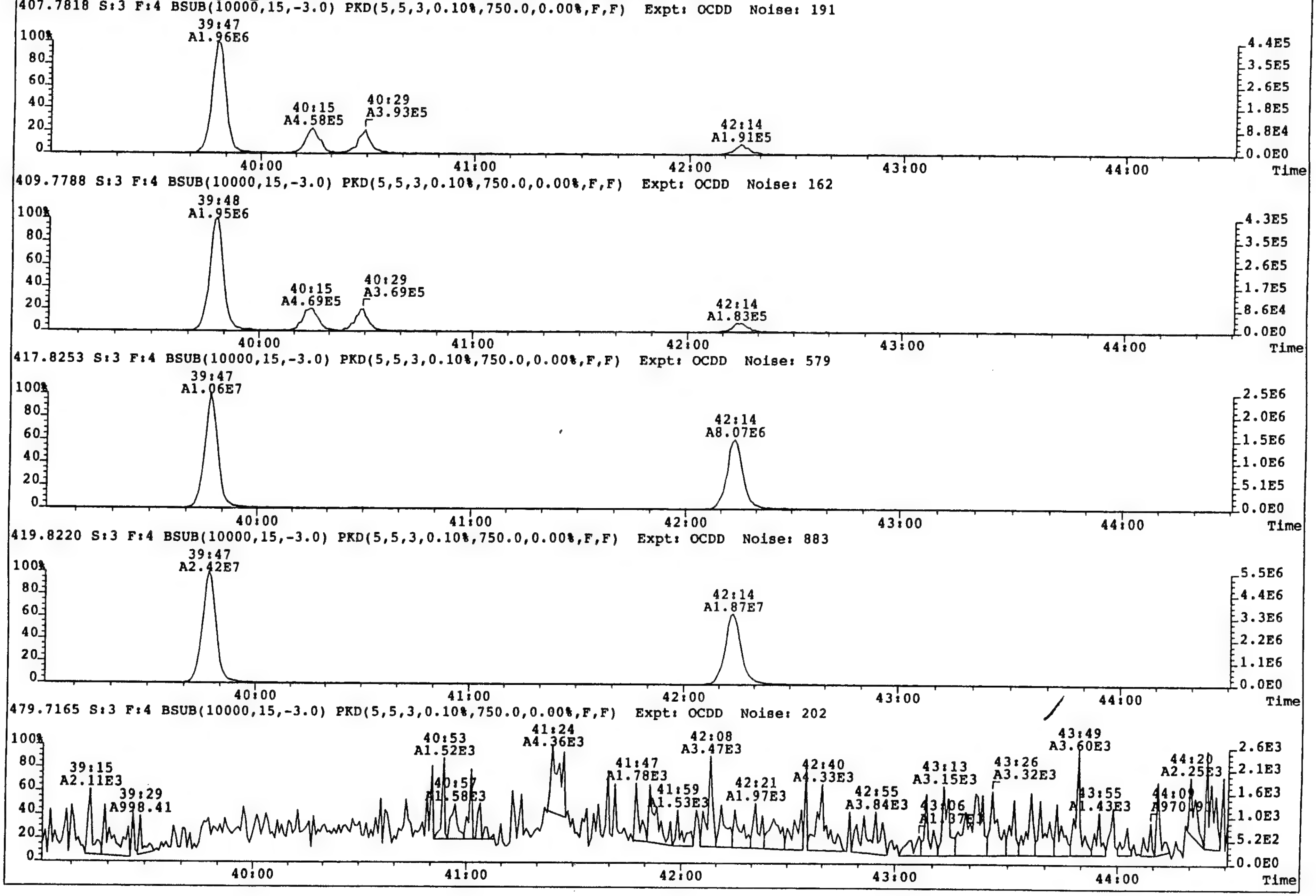


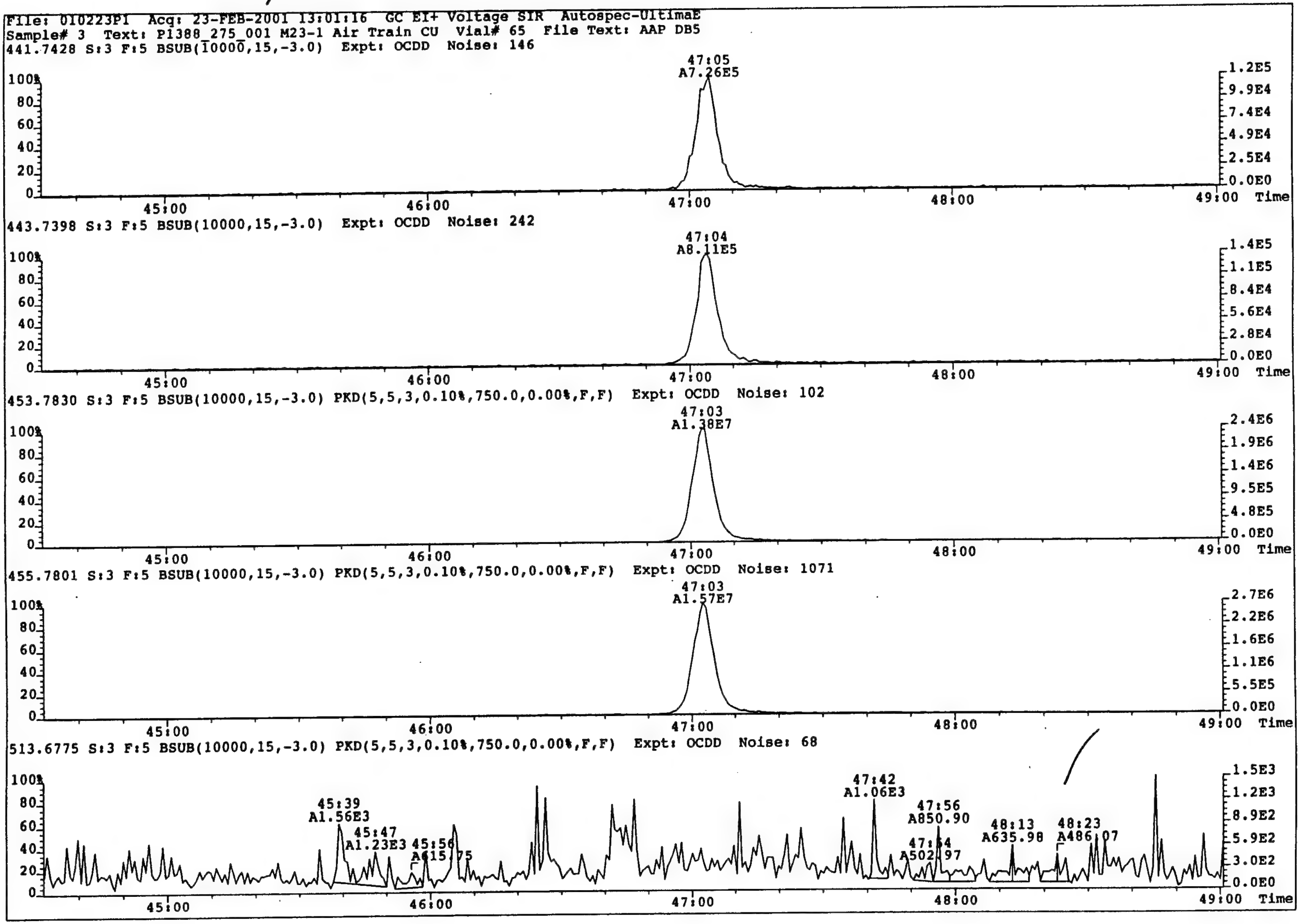
341.8568 S:3 F:2 BSUB(10000,15,-3.0) Expt: OCDD Noise: 342




File: 010223P1 Acq: 23-FEB-2001 13:01:16 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 3 Text: P1388_275_001 M23-1 Air Train CU Vial# 65 File Text: AAP DB5
373.8207 S:3 F:3 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 355
34:40 A5.16E5
34:52 A1.29E6
35:05 A1.20E5
35:17 A1.75E5
35:31 A8.72E4
35:56 A6.40E5
36:11 A6.10E5
36:21 A1.09E5
36:29 A1.29E5
36:50 A9.00E5
37:54 A1.30E5
3.7E5
3.0E5
2.2E5
1.5E5
7.5E4
0.0E0
375.8178 S:3 F:3 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 259
34:39 A4.30E5
34:52 A1.08E6
35:05 A1.01E5
35:18 A1.39E5
35:31 A6.71E4
35:56 A5.01E5
36:11 A4.89E5
36:21 A8.86E4
36:29 A1.09E5
36:51 A7.52E5
37:52 A9.72E4
3.2E5
2.6E5
1.9E5
1.3E5
6.4E4
0.0E0
383.8639 S:3 F:3 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 2124
36:02 A1.55E7
36:10 A1.79E7
37:50 A1.60E7
5.1E6
4.1E6
3.0E6
2.0E6
1.0E6
0.0E0
385.8610 S:3 F:3 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 1526
36:10 A3.42E7
37:50 A3.08E7
9.7E6
7.7E6
5.8E6
3.9E6
1.9E6
0.0E0
445.7555 S:3 F:3 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 104
34:57 A955.54
35:49 A953.61
37:08 A7.68E3
37:25 A6.42E3
37:33 A924.27
37:56 A2.24E3
38:14 A1.64E3
38:23 A1.59E3
38:29 A1.22E3
38:47 A1.10E3
2.5E3
2.0E3
1.5E3
1.0E3
5.0E2
0.0E0
100%
80
60
40
20
0
35:00
36:00
37:00
38:00
39:00 Time

File: 010223P1 Acq: 23-FEB-2001 13:01:16 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 3 Text: P1388_275_001 M23-1 Air Train CU Vial# 65 File Text: AAP DB5





File: 010223P1 Acq: 23-FEB-2001 13:01:16 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 3 Text: P1388_275_001 M23-1 Air Train CU Vial# 65 File Text: AAP DB5
441.7428 S:3 F:5 BSUB(10000,15,-3.0) Expt: OCDD Noise: 146
47:05
A7.26E5
1.2E5
9.9E4
7.4E4
4.9E4
2.5E4
0.0E0
443.7398 S:3 F:5 BSUB(10000,15,-3.0) Expt: OCDD Noise: 242
47:04
A8.11E5
1.4E5
1.1E5
8.4E4
5.6E4
2.8E4
0.0E0
453.7830 S:3 F:5 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 102
47:03
A1.38E7
2.4E6
1.9E6
1.4E6
9.5E5
4.8E5
0.0E0
455.7801 S:3 F:5 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 1071
47:03
A1.57E7
2.7E6
2.2E6
1.6E6
1.1E6
5.5E5
0.0E0
513.6775 S:3 F:5 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 68
45:39
A1.56E3
45:47
A1.23E3
45:56
A615.75
47:42
A1.06E3
47:56
A850.90
47:54
A502.97
48:13
A635.98
48:23
A486.07
1.5E3
1.2E3
8.9E2
5.9E2
3.0E2
0.0E0
100%
80
60
40
20
0
45:00
46:00
47:00
48:00
49:00
Time

Sample ID: M23-2

Method M23

Client Data		Sample Data		Laboratory Data			
Name:	PES	Matrix:	Air	Project No.:	P1388	Date Received:	6-Feb-01
Project ID:	F181.001	Weight/Volume:	1	Sample ID:	P1388_275_002	Date Extracted:	8-Feb-01
Date Collected:	31-Jan-01			QC Batch No.:	275	Date Analyzed:	14-FEB-01

Analyte	Conc. pg	DL pg	EMPC pg	Qualifier	Recoveries IS	Recoveries SS	Recoveries AS
2,3,7,8-TCDD	0.945			A B	98	102	86.2
1,2,3,7,8-PeCDD	2.44			A	108	105	86.2
1,2,3,4,7,8-HxCDD	EMPC		1.96	A	97.4	102	86.2
1,2,3,6,7,8-HxCDD	EMPC		5.04	A	97.4	102	86.2
1,2,3,7,8,9-HxCDD	2.76			A	97.4	102	86.2
1,2,3,4,6,7,8-HpCDD	21.5			A B	98.1	104	86.2
OCDD	57.1			A B	91.3	104	86.2
2,3,7,8-TCDF	8.77			A	94	102	86.2
1,2,3,7,8-PeCDF	15.2			A	95.4	105	86.2
2,3,4,7,8-PeCDF	36.1			A	95.4	105	86.2
1,2,3,4,7,8-HxCDF	40			A B	85.9	104	86.2
1,2,3,6,7,8-HxCDF	45.7			A	85.9	104	86.2
2,3,4,6,7,8-HxCDF	73.7				85.9	104	86.2
1,2,3,7,8,9-HxCDF	11.1			A	85.9	104	86.2
1,2,3,4,6,7,8-HpCDF	208			B	85.4	104	86.2
1,2,3,4,7,8,9-HpCDF	22.2			A	85.4	104	86.2
OCDF	118				88.9	104	86.2
Totals & TEQs							
TCDDs	13		15.6				
PeCDDs	31.3		33.9				
HxCDDs	42.9		49.9				
HpCDDs	44.4						
TCDFs	265						
PeCDFs	354		360				
HxCDFs	441						
HpCDFs	328						
Total PCDD/Fs	**1690**		**1710**				
TEQ (ND=0)	**41.9**		**42.6**	**ITEF**			
TEQ (ND=DL/2)	**41.9**		**42.6**	**ITEF**			

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Reviewer Cl
Date 25 Feb01

Client ID: M23-2 Filename: 010214P1 S: 5 Acq: 14-FEB-01 14:32:45 ConCal: 010214P1-
Lab ID: P1388_275_002 GC Column ID: db-5 ICal: MM1_M23_0, wt/vol: 1.000 EndCal: 010214P1-

41.

	Name	Resp	RA	RRF	RT	Conc	Qualif.	CDE	noise	Fac	DL	EMPC	Rec
	2,3,7,8-TCDD	1.91e+04	0.25 n	1.26	27:44	0.903			461	2.5	0.408		
	1,2,3,7,8-PeCDD	3.73e+04	1.44 y	1.01	33:11	2.44			589	2.5	0.925		
	1,2,3,4,7,8-HxCDD	2.77e+04	1.04 n	1.14	37:06	1.96			1208	2.5	1.92		
	1,2,3,6,7,8-HxCDD	6.38e+04	1.50 n	1.02	37:13	5.04			1208	2.5	2.14		
	1,2,3,7,8,9-HxCDD	3.90e+04	1.07 y	1.14	37:32	2.76			1208	2.5	1.91		
	1,2,3,4,6,7,8-HpCDD	2.94e+05	1.03 y	1.13	41:31	21.5			1157	2.5	2.46		
	OCDD	5.34e+05	0.88 y	1.03	46:51	57.1			970	2.5	3.72		
	2,3,7,8-TCDF	1.86e+05	0.85 y	1.05	26:51	8.77			1198	2.5	1.08		
	1,2,3,7,8-PeCDF	2.93e+05	1.45 y	1.04	31:43	15.2			1919	2.5	2.26		
	2,3,4,7,8-PeCDF	7.09e+05	1.46 y	1.05	32:50	36.1			1919	2.5	2.23		
	1,2,3,4,7,8-HxCDF	6.78e+05	1.20 y	1.13	36:07	40.0			1794	2.5	1.41		
	1,2,3,6,7,8-HxCDF	8.49e+05	1.20 y	1.24	36:16	45.7			1794	2.5	1.29		
	2,3,4,6,7,8-HxCDF	1.29e+06	1.21 y	1.16	36:55	73.7			1794	2.5	1.37		
	1,2,3,7,8,9-HxCDF	1.69e+05	1.27 y	1.02	37:58	11.1			1794	2.5	1.57		
	1,2,3,4,6,7,8-HpCDF	3.37e+06	1.01 y	1.54	39:53	208			929	2.5	1.03		
	1,2,3,4,7,8,9-HpCDF	3.03e+05	1.15 y	1.30	42:20	22.2			929	2.5	1.22		
	OCDF	1.33e+06	0.84 y	1.15	47:10	118			1241	2.5	3.66		
	Total Tetra-Dioxins	2.55e+05	0.72 y	1.26	24:00	12.0			461	2.5	0.408	15.6	
	Total Penta-Dioxins	4.79e+05	1.71 y	1.01	30:39	31.3			589	2.5	0.925	33.9	
	Total Hexa-Dioxins	5.87e+05	1.24 y	1.10	35:23	42.9			1208	2.5	1.99	49.9	
	Total Hepta-Dioxins	6.07e+05	1.04 y	1.13	40:19	44.4			1157	2.5	2.46	44.4	
	Total Tetra-Furans	5.62e+06	0.67 y	1.05	21:50	265			1198	2.5	1.08	265	
	1st Fnc. Penta-Furans	7.27e+05	1.72 y	1.05	28:52	37.3			2148	2.5	2.51	37.3	
	Total Penta-Furans	6.17e+06	1.38 y	1.05	30:26	317			1919	2.5	2.24		
	PeCDF Totals:					354						360	
	Total Hexa-Furans	7.60e+06	1.23 y	1.14	34:44	441			1794	2.5	1.41	441	
	Total Hepta-Furans	5.12e+06	1.01 y	1.42	39:53	328			929	2.5	1.12	328	
IS	13C-2,3,7,8-TCDD	6.72e+07	0.80 y	1.13	27:43	3920							98.0
IS	13C-1,2,3,7,8-PeCDD	6.05e+07	1.57 y	0.93	33:11	4330							108
IS	13C-1,2,3,6,7,8-HxCDD	4.95e+07	1.25 y	0.93	37:12	3900							97.4
IS	13C-1,2,3,4,6,7,8-HpCDD	4.84e+07	1.04 y	0.91	41:30	3920							98.1
IS	13C-OCDD	3.65e+07	0.89 y	0.73	46:50	3650							91.3
IS	13C-2,3,7,8-TCDF	8.12e+07	0.78 y	1.06	26:49	3760							94.0
IS	13C-1,2,3,7,8-PeCDF	7.45e+07	1.57 y	0.96	31:42	3820							95.4
IS	13C-1,2,3,6,7,8-HxCDF	6.00e+07	0.51 y	1.28	36:15	3430							85.9
IS	13C-1,2,3,4,6,7,8-HpCDF	4.20e+07	0.45 y	0.90	39:52	3420							85.4
IS	13C-OCDF	3.93e+07	0.88 y	0.81	47:09	3560							88.9
RS/RT	13C-1,2,3,4-TCDD	6.05e+07	0.79 y	1.00	27:03	4000							-
RS	13C-1,2,3,4-TCDF	8.14e+07	0.77 y	1.00	25:27	4000							-
RS/RT	13C-1,2,3,7,8,9-HxCDD	5.45e+07	1.23 y	1.00	37:31	4000							-
PS	37Cl-2,3,7,8-TCDD	3.51e+07		0.51	27:44	4060							102
PS	13C-2,3,4,7,8-PeCDF	7.61e+07	1.53 y	0.97	32:49	4200							105
PS	13C-1,2,3,4,7,8-HxCDD	4.65e+07	1.26 y	0.92	37:05	4070							102
PS	13C-1,2,3,4,7,8-HxCDF	5.67e+07	0.52 y	0.91	36:06	4150							104
PS	13C-1,2,3,4,7,8,9-HpCDF	3.75e+07	0.44 y	0.85	42:19	4180							104
AS	13C-1,2,3,7,8,9-HxCDF	5.02e+07	0.52 y	1.07	37:55	3450							86.2

Reviewer: C

Date: 24 Feb 01

Analyst: GAG

Date: 24 Feb 01

Totals class: TCDD EMPC Function: 1 Run #: 12
File Name: 010214P1 Sample #: 5 Sample text: P1388_275_002 M23-2 Air Train

Acquired: 14-FEB-01 14:32:45 Processed: 20-FEB-01 12:06:58

Total Conc.: 15.595 Unnamed Conc.: 14.692

RT	m1 Resp	mod.	m2 Resp	mod.	RA		Resp	Adj_Resp	S/N		Conc.	Name
24:00	2.372e+04	y	3.309e+04	y	0.72	y	5.681e+04	5.681e+04	1.51e+01	y	2.68	
24:22	1.610e+04	y	1.791e+04	y	0.90	n	3.401e+04	3.170e+04	1.21e+01	y	1.50	
24:48	1.411e+04	y	1.952e+04	y	0.72	y	3.363e+04	3.363e+04	8.93e+00	y	1.59	
25:52	2.873e+04	y	3.291e+04	y	0.87	y	6.164e+04	6.164e+04	1.25e+01	y	2.91	
26:04	1.571e+04	y	1.998e+04	y	0.79	y	3.569e+04	3.569e+04	1.09e+01	y	1.68	
26:15	1.258e+04	y	1.383e+04	y	0.91	n	2.640e+04	2.447e+04	8.11e+00	y	1.15	
27:26	2.114e+04	y	2.588e+04	y	0.82	y	4.702e+04	4.702e+04	1.21e+01	y	2.22	
27:44	8.330e+03	y	3.278e+04	y	0.25	n	4.111e+04	1.915e+04	1.80e+01	y	0.903	2,3,7,8-TCDD
28:04	8.657e+03	y	1.180e+04	y	0.73	y	2.045e+04	2.045e+04	7.31e+00	y	0.965	

Totals class: PeCDD EMPC Function: 2 Run #: 12
File Name: 010214P1 Sample #: 5 Sample text: P1388_275_002 M23-2 Air Train

Acquired: 14-FEB-01 14:32:45 Processed: 20-FEB-01 12:06:58

Total Conc.: 33.882 Unnamed Conc.: 31.445

RT	m1 Resp	mod.	m2 Resp	mod.	RA		Resp	Adj_Resp	S/N		Conc.	Name
30:39	8.110e+04	y	4.749e+04	y	1.71	y	1.286e+05	1.286e+05	1.65e+01	y	8.39	
31:12	1.570e+04	y	1.101e+04	y	1.43	y	2.672e+04	2.672e+04	5.25e+00	y	1.74	
31:45	6.211e+04	y	3.768e+04	y	1.65	y	9.979e+04	9.979e+04	1.58e+01	y	6.51	
31:57	1.885e+04	y	1.122e+04	y	1.68	y	3.007e+04	3.007e+04	8.29e+00	y	1.96	
32:03	2.815e+04	y	1.773e+04	y	1.59	y	4.588e+04	4.588e+04	9.42e+00	y	3.00	
32:19	3.524e+04	y	2.142e+04	y	1.65	y	5.667e+04	5.667e+04	9.42e+00	y	3.70	
32:41	3.312e+04	n	2.132e+04	y	1.55	y	5.444e+04	5.444e+04	1.19e+01	y	3.55	
33:11	2.206e+04	y	1.527e+04	y	1.44	y	3.733e+04	3.733e+04	6.28e+00	y	2.44	1,2,3,7,8-PeCDD
33:17	1.248e+04	y	1.007e+04	y	1.24	n	2.255e+04	2.053e+04	5.25e+00	y	1.34	
33:39	1.451e+04	y	7.442e+03	y	1.95	n	2.196e+04	1.898e+04	4.37e+00	y	1.24	

Totals class: HxCDD EMPC Function: 3 Run #: 12
File Name: 010214P1 Sample #: 5 Sample text: P1388_275_002 M23-2 Air Train

Acquired: 14-FEB-01 14:32:45 Processed: 20-FEB-01 12:06:58

Total Conc.: 49.906 Unnamed Conc.: 40.154

RT	m1 Resp	mod.	m2 Resp	mod.	RA		Resp	Adj_Resp	S/N		Conc.	Name
35:23	5.194e+04	y	4.180e+04	y	1.24	y	9.374e+04	9.374e+04	7.63e+00	y	6.87	

RT	m1 Resp	mod.	m2 Resp	mod.	RA		Resp	Adj_Resp	S/N		Conc.	Name
36:03	1.060e+05	y	7.841e+04	y	1.35	y	1.844e+05	1.844e+05	1.61e+01	y	13.5	
36:19	1.166e+05	y	8.288e+04	y	1.41	y	1.995e+05	1.995e+05	1.29e+01	y	14.6	
36:28	1.788e+04	y	1.453e+04	y	1.23	y	3.241e+04	3.241e+04	2.89e+00	y	2.37	
37:06	1.531e+04	y	1.477e+04	y	1.04	n	3.008e+04	2.766e+04	3.95e+00	y	1.96	1,2,3,4,7,8-HxCDD
37:13	4.270e+04	y	2.849e+04	y	1.50	n	7.118e+04	6.381e+04	5.53e+00	y	5.04	1,2,3,6,7,8-HxCDD
37:25	2.083e+04	y	1.718e+04	y	1.21	y	3.802e+04	3.802e+04	3.71e+00	y	2.79	
37:32	2.016e+04	y	1.888e+04	y	1.07	y	3.904e+04	3.904e+04	3.63e+00	y	2.76	1,2,3,7,8,9-HxCDD

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Totals class: HpCDD EMPC Function: 4 Run #: 12
File Name: 010214P1 Sample #: 5 Sample text: P1388_275_002 M23-2 Air Train

Acquired: 14-FEB-01 14:32:45 Processed: 20-FEB-01 12:06:58

Total Conc.: 44.412 Unnamed Conc.: 22.863

RT	m1 Resp	mod.	m2 Resp	mod.	RA		Resp	Adj_Resp	S/N		Conc.	Name
40:19	1.595e+05	n	1.529e+05	n	1.04	y	3.124e+05	3.124e+05	2.93e+01	y	22.9	
41:31	1.492e+05	n	1.452e+05	n	1.03	y	2.944e+05	2.944e+05	2.29e+01	y	21.5	1,2,3,4,6,7,8-HpCDD

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Totals class: TCDF EMPC Function: 1 Run #: 12
File Name: 010214P1 Sample #: 5 Sample text: P1388_275_002 M23-2 Air Train

Acquired: 14-FEB-01 14:32:45 Processed: 20-FEB-01 12:06:58

Total Conc.: 264.52 Unnamed Conc.: 255.748

RT	m1 Resp	mod.	m2 Resp	mod.	RA		Resp	Adj_Resp	S/N		Conc.	Name
21:50	6.158e+04	n	9.160e+04	n	0.67	y	1.532e+05	1.532e+05	1.38e+01	y	7.21	
22:24	4.874e+04	y	7.249e+04	y	0.67	y	1.212e+05	1.212e+05	1.12e+01	y	5.71	
23:04	7.674e+04	n	1.073e+05	n	0.72	y	1.840e+05	1.840e+05	1.58e+01	y	8.66	
23:33	2.671e+05	y	3.706e+05	n	0.72	y	6.377e+05	6.377e+05	3.29e+01	y	30.0	
23:58	1.743e+05	y	2.571e+05	y	0.68	y	4.315e+05	4.315e+05	2.30e+01	y	20.3	
24:24	8.418e+04	y	1.229e+05	y	0.68	y	2.071e+05	2.071e+05	1.89e+01	y	9.75	
24:32	5.088e+04	y	6.493e+04	y	0.78	y	1.158e+05	1.158e+05	1.37e+01	y	5.45	
24:42	5.749e+04	y	8.109e+04	y	0.71	y	1.386e+05	1.386e+05	1.41e+01	y	6.52	
25:05	6.451e+04	y	9.819e+04	y	0.66	y	1.627e+05	1.627e+05	1.50e+01	y	7.66	
25:13	1.388e+05	y	1.893e+05	y	0.73	y	3.281e+05	3.281e+05	3.52e+01	y	15.4	
25:22	1.202e+05	y	1.676e+05	y	0.72	y	2.878e+05	2.878e+05	3.22e+01	y	13.5	
25:29	2.469e+05	y	3.325e+05	y	0.74	y	5.794e+05	5.794e+05	5.50e+01	y	27.3	
25:56	8.901e+04	y	1.221e+05	y	0.73	y	2.111e+05	2.111e+05	2.06e+01	y	9.94	
26:03	1.704e+04	n	2.516e+04	y	0.68	y	4.220e+04	4.220e+04	4.70e+00	y	1.99	
26:13	6.814e+04	y	9.639e+04	y	0.71	y	1.645e+05	1.645e+05	2.11e+01	y	7.75	
26:25	1.262e+05	n	1.834e+05	n	0.69	y	3.096e+05	3.096e+05	3.39e+01	y	14.6	
26:38	1.424e+05	y	2.081e+05	y	0.68	y	3.505e+05	3.505e+05	4.02e+01	y	16.5	
26:44	1.099e+05	y	1.539e+05	y	0.71	y	2.638e+05	2.638e+05	3.10e+01	y	12.4	
26:51	8.564e+04	y	1.007e+05	y	0.85	y	1.863e+05	1.863e+05	2.34e+01	y	8.77	2,3,7,8-TCDF
27:14	2.906e+05	n	3.718e+05	n	0.78	y	6.624e+05	6.624e+05	6.59e+01	y	31.2	
27:28	1.740e+04	y	2.214e+04	y	0.79	y	3.954e+04	3.954e+04	4.21e+00	y	1.86	
27:45	1.698e+04	n	2.467e+04	y	0.69	y	4.165e+04	4.165e+04	5.28e+00	y	1.96	

Page 12 of 18

Totals class: 1st Fnc.PeCDF EMPC Function: 1 Run #: 12
File Name: 010214P1 Sample #: 5 Sample text: P1388_275_002 M23-2 Air Train

Acquired: 14-FEB-01 14:32:45 Processed: 20-FEB-01 12:06:58

Total Conc.: 37.331 Unnamed Conc.: 37.331

RT	m1 Resp	mod.	m2 Resp	mod.	RA		Resp	Adj_Resp	S/N		Conc.	Name
28:52	4.599e+05	n	2.671e+05	n	1.72	y	7.270e+05	7.270e+05	2.82e+01	y	37.3	

Totals class: PeCDF EMPC Function: 2 Run #: 12
File Name: 010214P1 Sample #: 5 Sample text: P1388_275_002 M23-2 Air Train

Acquired: 14-FEB-01 14:32:45 Processed: 20-FEB-01 12:06:58

Total Conc.: 322.27 Unnamed Conc.: 270.944

RT	m1 Resp	mod.	m2 Resp	mod.	RA		Resp	Adj_Resp	S/N		Conc.	Name
30:26	4.953e+05	y	3.587e+05	y	1.38	y	8.540e+05	8.540e+05	3.62e+01	y	43.9	
30:35	5.362e+05	y	3.622e+05	y	1.48	y	8.984e+05	8.984e+05	3.44e+01	y	46.1	
30:41	1.425e+05	y	9.719e+04	y	1.47	y	2.396e+05	2.396e+05	1.44e+01	y	12.3	
30:47	4.254e+04	y	3.028e+04	y	1.40	y	7.282e+04	7.282e+04	4.58e+00	y	3.74	
31:02	7.632e+04	y	5.606e+04	y	1.36	y	1.324e+05	1.324e+05	5.91e+00	y	6.80	
31:10	9.352e+04	y	6.412e+04	y	1.46	y	1.576e+05	1.576e+05	1.20e+01	y	8.10	
31:17	5.377e+05	y	3.760e+05	y	1.43	y	9.137e+05	9.137e+05	3.56e+01	y	46.9	
31:30	1.096e+05	n	7.756e+04	y	1.41	y	1.871e+05	1.871e+05	1.12e+01	y	9.61	
31:43	1.734e+05	n	1.199e+05	n	1.45	y	2.933e+05	2.933e+05	1.94e+01	y	15.2	1,2,3,7,8-PeCDF
32:00	3.377e+05	y	2.250e+05	n	1.50	y	5.627e+05	5.627e+05	2.04e+01	y	28.9	
32:10	2.931e+04	y	2.298e+04	y	1.28	n	5.229e+04	4.822e+04	2.86e+00	y	2.48	
32:35	3.694e+04	y	3.073e+04	y	1.20	n	6.766e+04	6.077e+04	5.14e+00	y	3.12	
32:43	6.357e+05	y	4.118e+05	y	1.54	y	1.048e+06	1.048e+06	5.95e+01	y	53.8	
32:50	4.216e+05	y	2.878e+05	y	1.46	y	7.094e+05	7.094e+05	3.66e+01	y	36.1	2,3,4,7,8-PeCDF
33:10	3.625e+04	y	2.600e+04	y	1.39	y	6.225e+04	6.225e+04	3.70e+00	y	3.20	
33:56	2.364e+04	y	1.551e+04	y	1.52	y	3.915e+04	3.915e+04	2.80e+00	y	2.01	

Totals class: HxCDF EMPC Function: 3 Run #: 12
File Name: 010214P1 Sample #: 5 Sample text: P1388_275_002 M23-2 Air Train

Acquired: 14-FEB-01 14:32:45 Processed: 20-FEB-01 12:06:58

Total Conc.: 440.85 Unnamed Conc.: 270.352

RT	m1 Resp	mod.	m2 Resp	mod.	RA		Resp	Adj_Resp	S/N		Conc.	Name
34:44	3.916e+05	n	3.188e+05	n	1.23	y	7.104e+05	7.104e+05	5.37e+01	y	41.6	
34:56	1.075e+06	n	8.895e+05	n	1.21	y	1.965e+06	1.965e+06	1.39e+02	y	115	
35:10	9.354e+04	n	7.599e+04	n	1.23	y	1.695e+05	1.695e+05	1.07e+01	y	9.93	
35:22	1.351e+05	n	1.158e+05	n	1.17	y	2.509e+05	2.509e+05	1.76e+01	y	14.7	

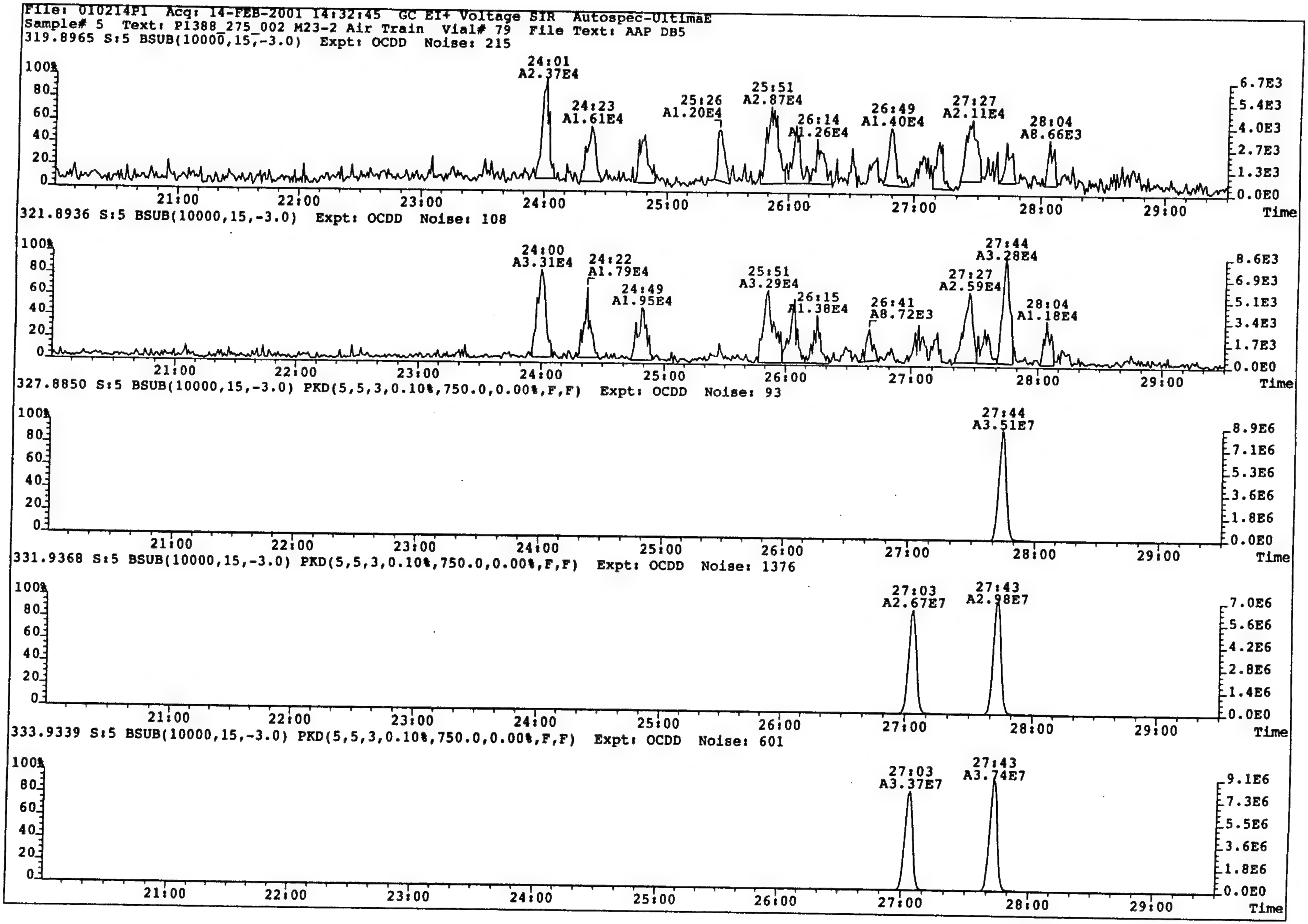
35:35	7.291e+04	n	5.418e+04	n	1.35	y	1.271e+05	1.271e+05	9.47e+00	y	7.45	
36:00	4.950e+05	n	4.046e+05	n	1.22	y	8.996e+05	8.996e+05	6.53e+01	y	52.7	
36:07	3.707e+05	n	3.076e+05	n	1.20	y	6.783e+05	6.783e+05	4.77e+01	y	40.0	1,2,3,4,7,8-HxCDF
36:16	4.629e+05	n	3.859e+05	n	1.20	y	8.488e+05	8.488e+05	6.45e+01	y	45.7	1,2,3,6,7,8-HxCDF
36:25	7.853e+04	n	6.828e+04	n	1.15	y	1.468e+05	1.468e+05	9.54e+00	y	8.60	
36:34	9.969e+04	n	8.190e+04	n	1.22	y	1.816e+05	1.816e+05	1.29e+01	y	10.6	
36:42	8.692e+04	n	7.646e+04	n	1.14	y	1.634e+05	1.634e+05	1.23e+01	y	9.57	
36:55	7.060e+05	n	5.812e+05	n	1.21	y	1.287e+06	1.287e+06	8.62e+01	y	73.7	2,3,4,6,7,8-HxCDF
37:58	9.479e+04	n	7.466e+04	n	1.27	y	1.695e+05	1.695e+05	8.15e+00	y	11.1	1,2,3,7,8,9-HxCDF

Totals class: HpCDF EMPC Function: 4 Run #: 12
File Name: 010214P1 Sample #: 5 Sample text: P1388_275_002 M23-2 Air Train

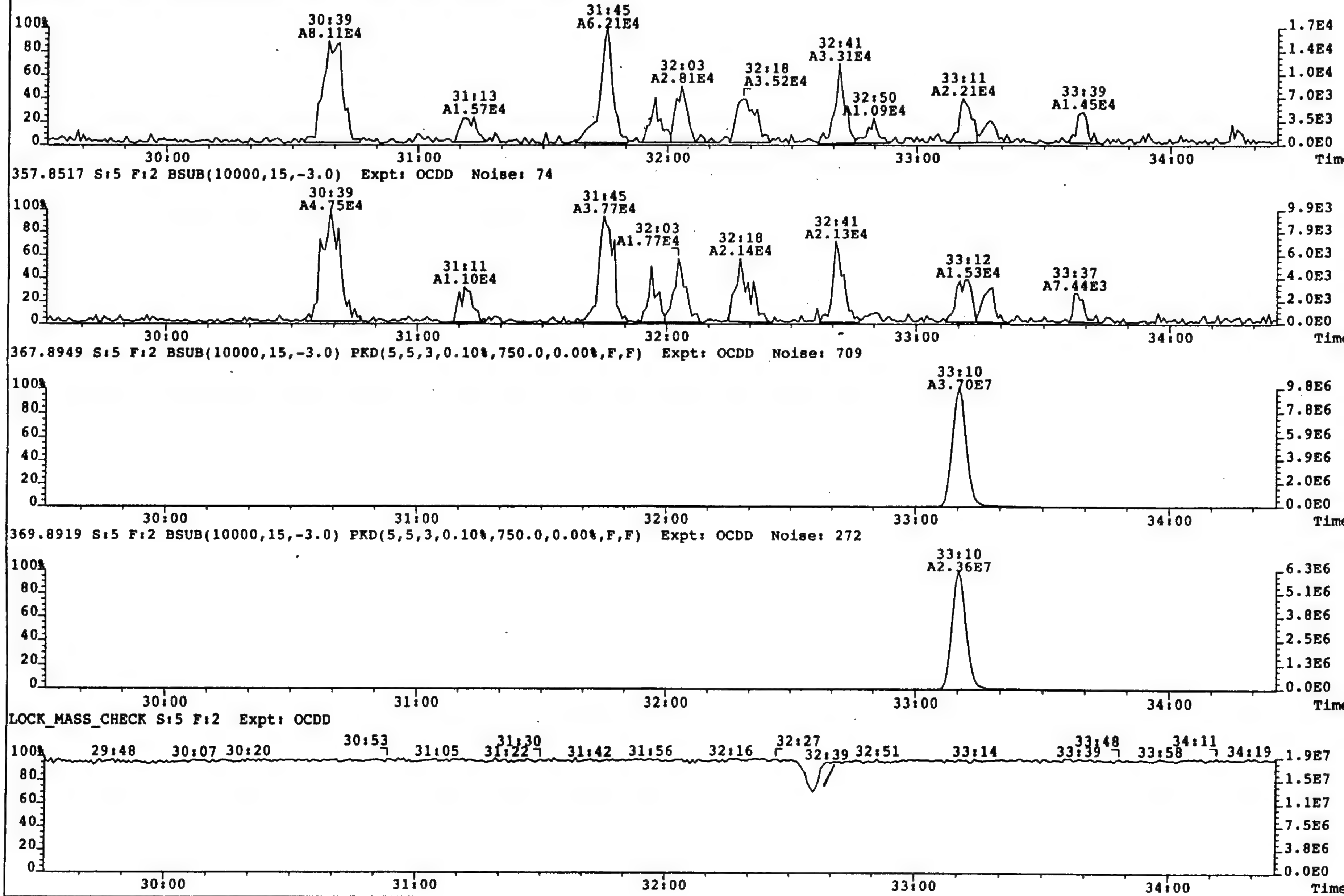
Acquired: 14-FEB-01 14:32:45 Processed: 20-FEB-01 12:06:58

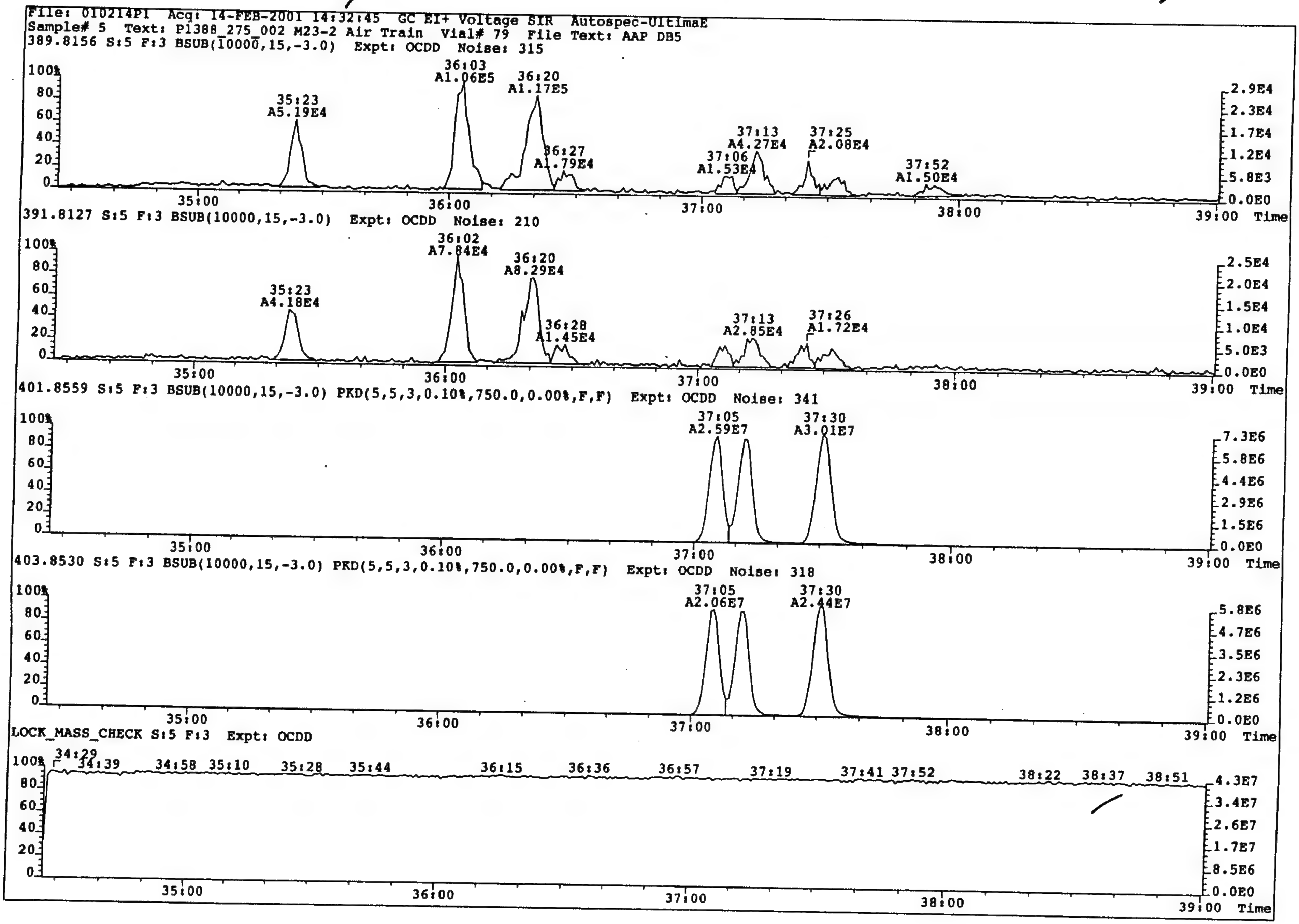
Total Conc.: 327.58 Unnamed Conc.: 96.887

RT	m1 Resp	mod.	m2 Resp	mod.	RA		Resp	Adj_Resp	S/N		Conc.	Name
39:53	1.698e+06	n	1.677e+06	n	1.01	y	3.375e+06	3.375e+06	3.76e+02	y	208	1,2,3,4,6,7,8-HpCDF
40:19	3.964e+05	n	4.117e+05	n	0.96	y	8.081e+05	8.081e+05	8.62e+01	y	54.2	
40:34	3.310e+05	n	3.057e+05	n	1.08	y	6.367e+05	6.367e+05	6.70e+01	y	42.7	
42:20	1.617e+05	n	1.412e+05	n	1.15	y	3.029e+05	3.029e+05	3.08e+01	y	22.2	1,2,3,4,7,8,9-HpCDF


File: 010214P1 Acq: 14-FEB-2001 14:32:45 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 5 Text: P1388_275_002 M23-2 Air Train Vial# 79 File Text: AAP DB5
319.8965 S:5 BSUB(10000,15,-3.0) Expt: OCDD Noise: 215
24:01 A2.37E4
24:23 A1.61E4
25:26 A1.20E4
25:51 A2.87E4
26:14 A1.26E4
26:49 A1.40E4
27:27 A2.11E4
28:04 A8.66E3
321.8936 S:5 BSUB(10000,15,-3.0) Expt: OCDD Noise: 108
24:00 A3.31E4
24:22 A1.79E4
24:49 A1.95E4
25:51 A3.29E4
26:15 A1.38E4
26:41 A8.72E3
27:27 A2.59E4
27:44 A3.28E4
28:04 A1.18E4
327.8850 S:5 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 93
27:44 A3.51E7
331.9368 S:5 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 1376
27:03 A2.67E7
27:43 A2.98E7
333.9339 S:5 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 601
27:03 A3.37E7
27:43 A3.74E7
Time

File: 010214P1 Acq: 14-FEB-2001 14:32:45 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 5 Text: P1388_275_002 M23-2 Air Train Vial# 79 File Text: AAP DB5
355.8546 S:5 F:2 BSUB(10000,15,-3.0) Expt: OCDD Noise: 170

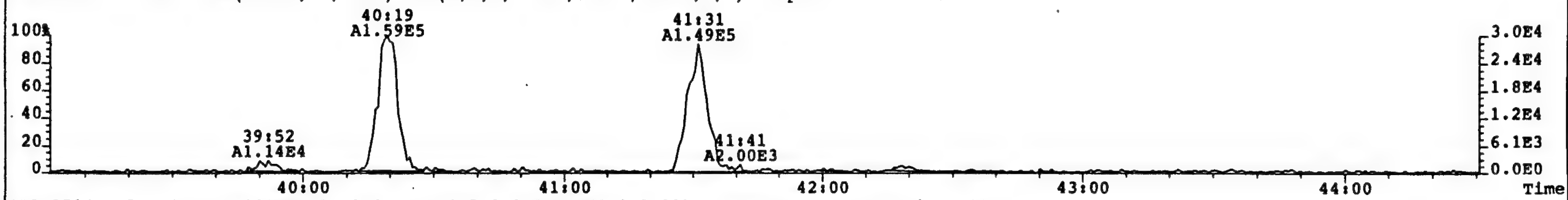




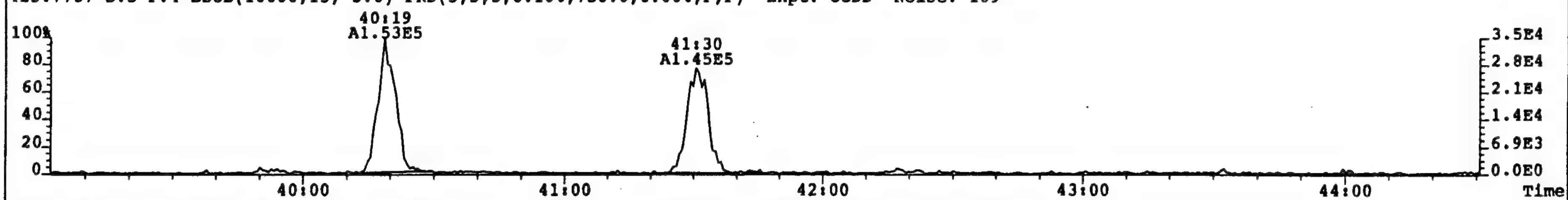
File: 010214P1 Acq: 14-FEB-2001 14:32:45 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 5 Text: P1388_275_002 M23-2 Air Train Vial# 79 File Text: AAP DB5
389.8156 S:5 F:3 BSUB(10000,15,-3.0) Expt: OCDD Noise: 315
35:23 A5.19E4
36:03 A1.06E5
36:20 A1.17E5
36:27 A1.79E4
37:06 A1.53E4
37:13 A4.27E4
37:25 A2.08E4
37:52 A1.50E4
391.8127 S:5 F:3 BSUB(10000,15,-3.0) Expt: OCDD Noise: 210
35:23 A4.18E4
36:02 A7.84E4
36:20 A8.29E4
36:28 A1.45E4
37:13 A2.85E4
37:26 A1.72E4
401.8559 S:5 F:3 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 341
37:05 A2.59E7
37:30 A3.01E7
403.8530 S:5 F:3 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 318
37:05 A2.06E7
37:30 A2.44E7
LOCK_MASS_CHECK S:5 F:3 Expt: OCDD
34:29 34:39 34:58 35:10 35:28 35:44 36:15 36:36 36:57 37:19 37:41 37:52 38:22 38:37 38:51
100% 80 60 40 20 0
2.9E4 2.3E4 1.7E4 1.2E4 5.8E3 0.0E0
2.5E4 2.0E4 1.5E4 1.0E4 5.0E3 0.0E0
7.3E6 5.8E6 4.4E6 2.9E6 1.5E6 0.0E0
5.8E6 4.7E6 3.5E6 2.3E6 1.2E6 0.0E0
4.3E7 3.4E7 2.6E7 1.7E7 8.5E6 0.0E0
35:00 36:00 37:00 38:00 39:00 Time

File: 010214P1 Acq: 14-FEB-2001 14:32:45 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 5 Text: P1388_275_002 M23-2 Air Train Vial# 79 File Text: AAP DB5

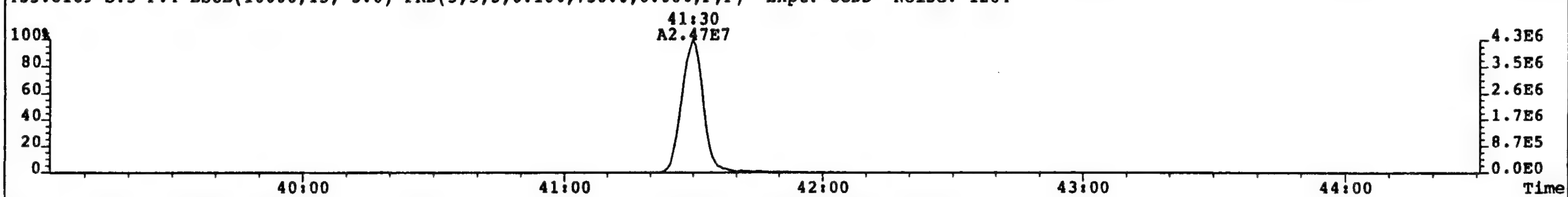
423.7767 S:5 F:4 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 116



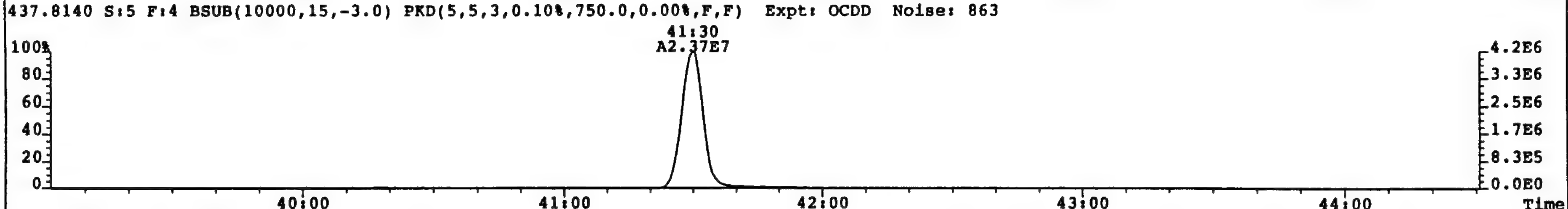
425.7737 S:5 F:4 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 109



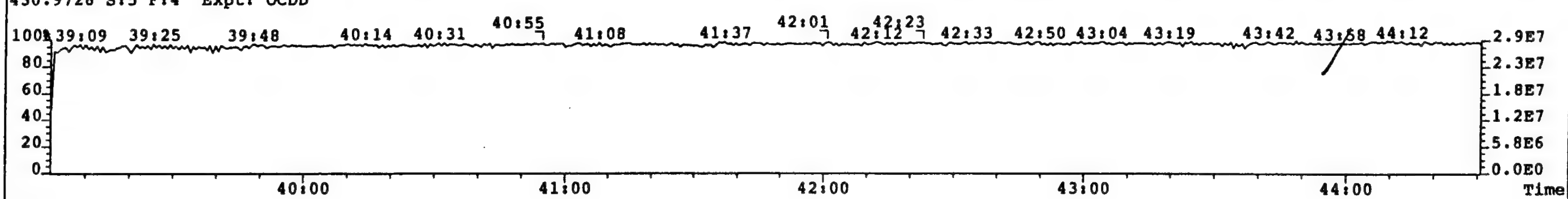
435.8169 S:5 F:4 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 1284

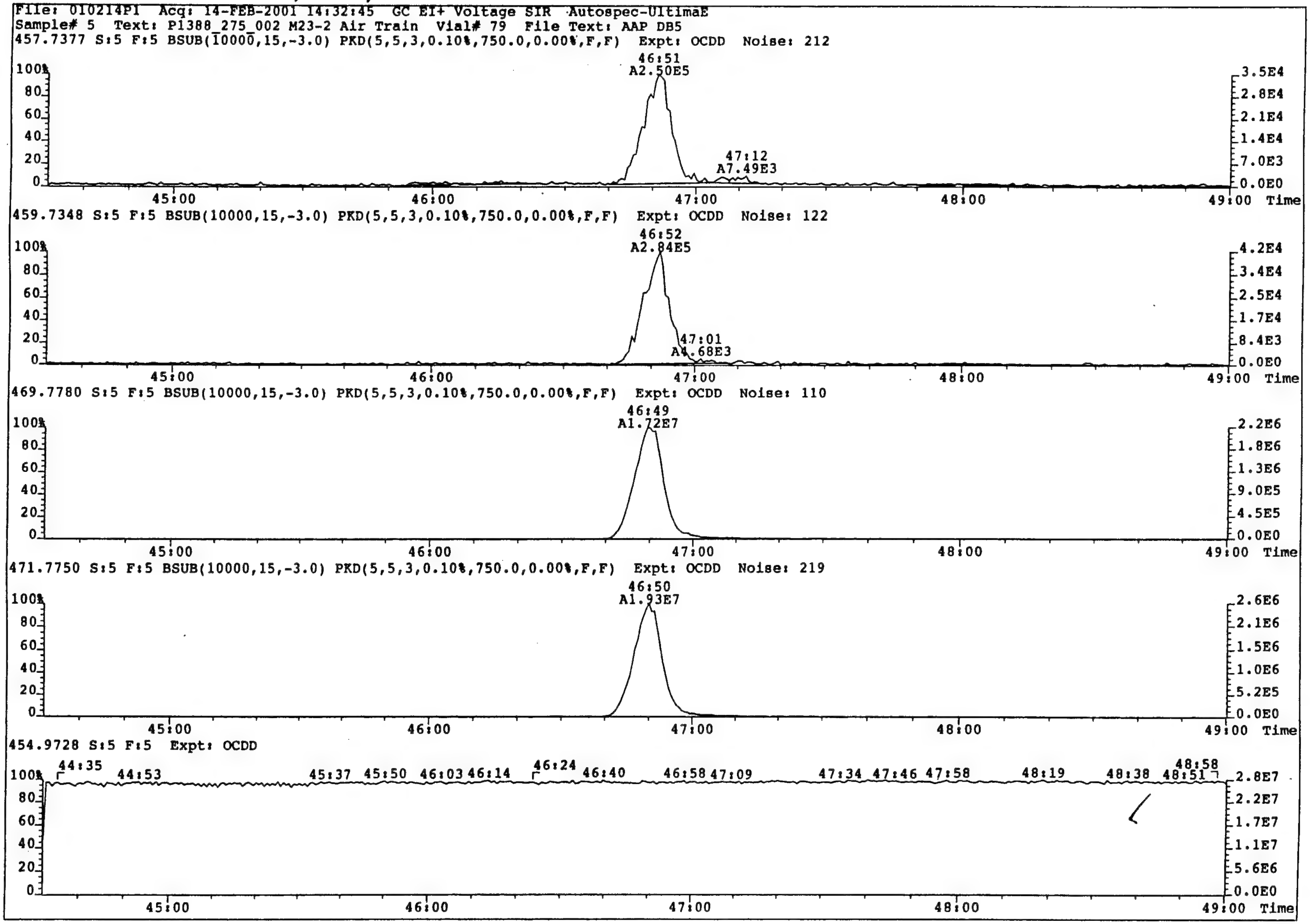


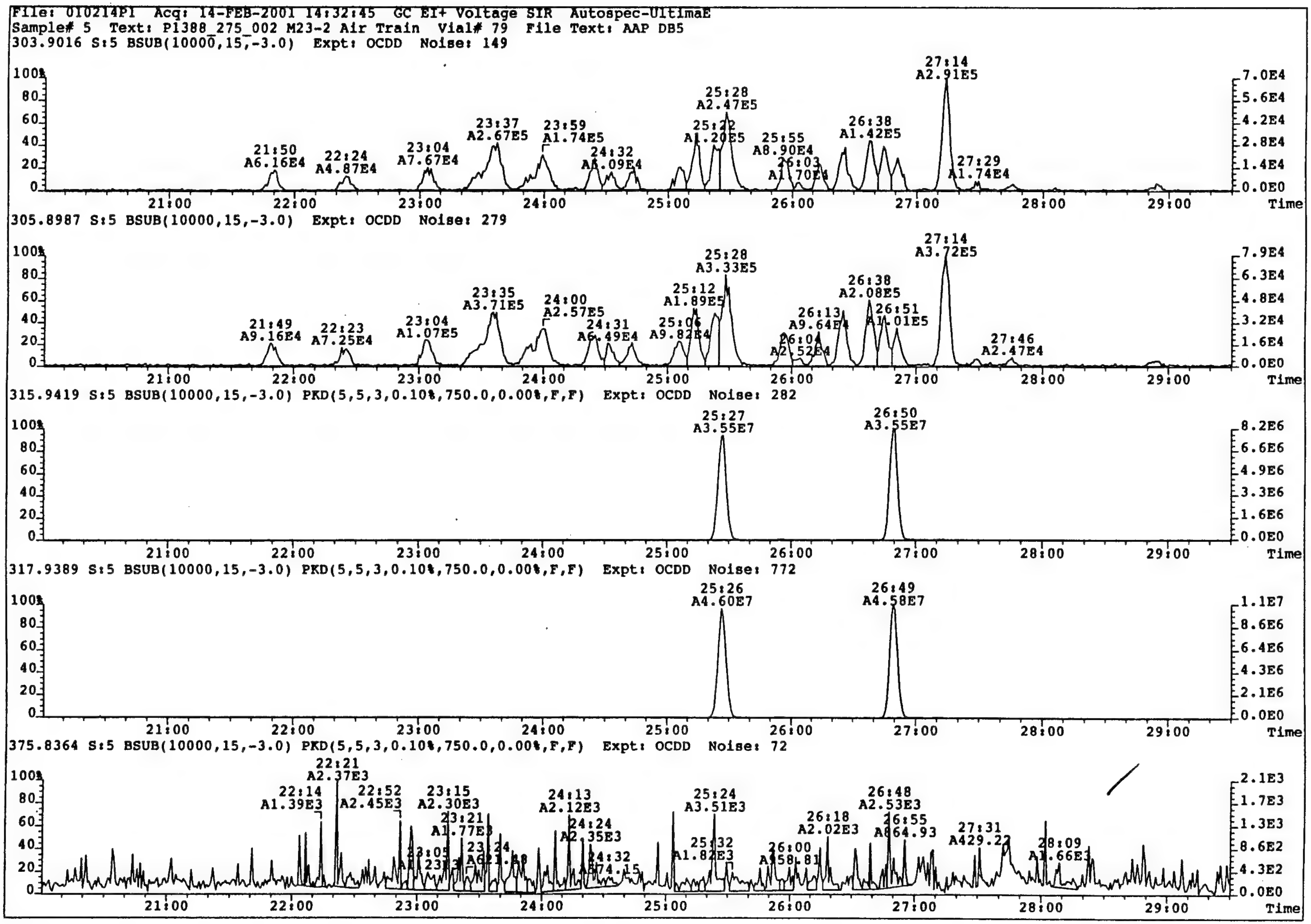
437.8140 S:5 F:4 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 863



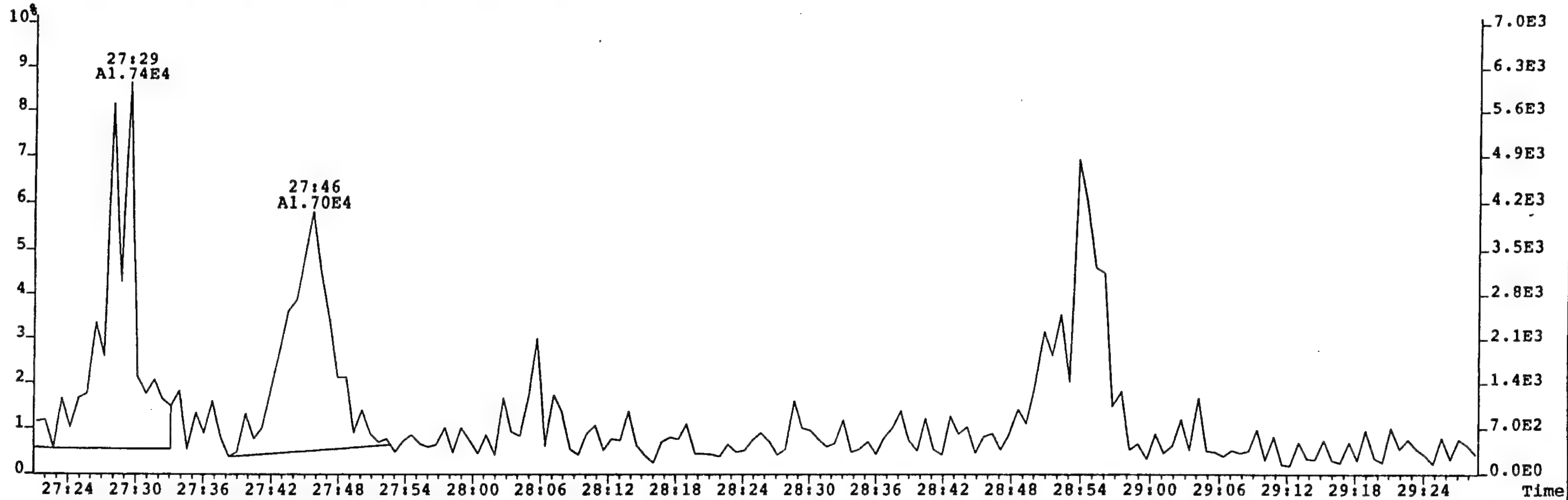
430.9728 S:5 F:4 Expt: OCDD



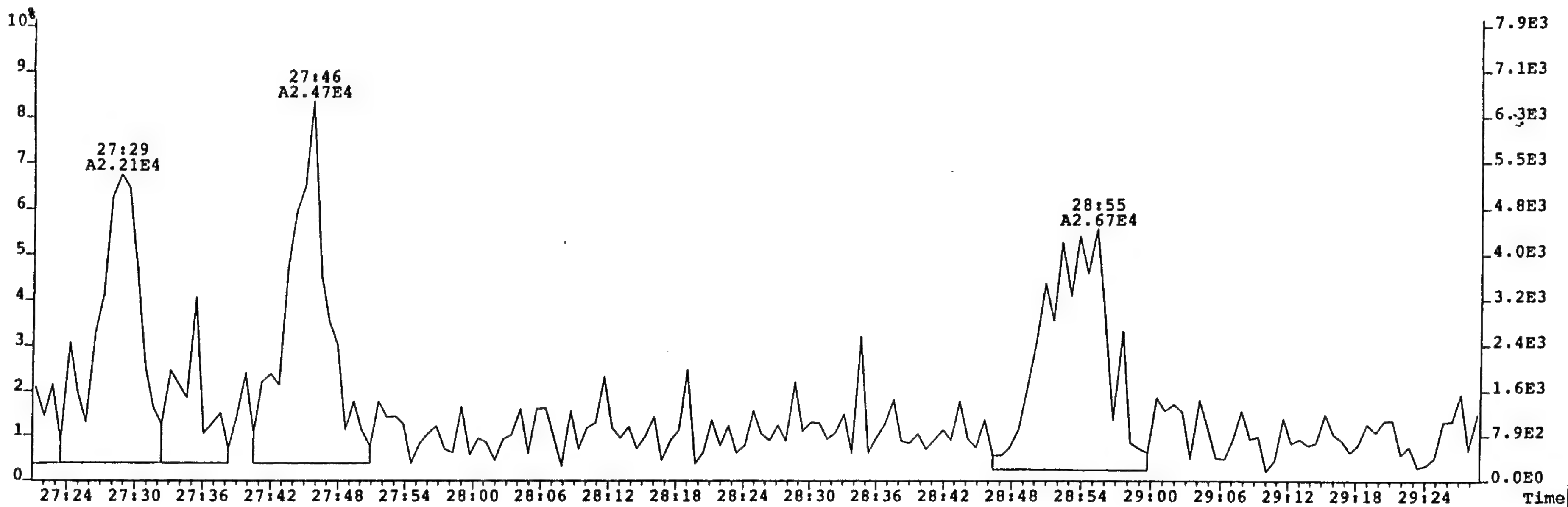

File: 010214P1 Acq: 14-FEB-2001 14:32:45 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 5 Text: P1388_275_002 M23-2 Air Train Vial# 79 File Text: AAP DB5
457.7377 S:5 F:5 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 212
46:51
A2.50E5
47:12
A7.49E3
100%
80
60
40
20
0
3.5E4
2.8E4
2.1E4
1.4E4
7.0E3
0.0E0
45:00
46:00
47:00
48:00
49:00 Time
459.7348 S:5 F:5 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 122
46:52
A2.84E5
47:01
A4.68E3
4.2E4
3.4E4
2.5E4
1.7E4
8.4E3
0.0E0
469.7780 S:5 F:5 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 110
46:49
A1.72E7
2.2E6
1.8E6
1.3E6
9.0E5
4.5E5
0.0E0
471.7750 S:5 F:5 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 219
46:50
A1.93E7
2.6E6
2.1E6
1.5E6
1.0E6
5.2E5
0.0E0
454.9728 S:5 F:5 Expt: OCDD
44:35 44:53 45:37 45:50 46:03 46:14 46:24 46:40 46:58 47:09 47:34 47:46 47:58 48:19 48:38 48:51 48:58
2.8E7
2.2E7
1.7E7
1.1E7
5.6E6
0.0E0


File: 010214P1 Acq: 14-FEB-2001 14:32:45 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 5 Text: P1388_275_002 M23-2 Air Train Vial# 79 File Text: AAP DB5
303.9016 S:5 BSUB(10000,15,-3.0) Expt: OCDD Noise: 149
21:50 A6.16E4
22:24 A4.87E4
23:04 A7.67E4
23:37 A2.67E5
23:59 A1.74E5
25:28 A2.47E5
25:55 A8.90E4
26:38 A1.42E5
27:14 A2.91E5
27:29 A1.74E4
305.8987 S:5 BSUB(10000,15,-3.0) Expt: OCDD Noise: 279
21:49 A9.16E4
22:23 A7.25E4
23:04 A1.07E5
23:35 A3.71E5
24:00 A2.57E5
25:12 A1.89E5
25:28 A3.33E5
26:38 A2.08E5
27:14 A3.72E5
27:46 A2.47E4
315.9419 S:5 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 282
25:27 A3.55E7
26:50 A3.55E7
317.9389 S:5 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 772
25:26 A4.60E7
26:49 A4.58E7
375.8364 S:5 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 72
22:14 A1.39E3
22:21 A2.37E3
22:52 A2.45E3
23:15 A2.30E3
24:13 A2.12E3
25:24 A3.51E3
26:18 A2.02E3
26:48 A2.53E3
27:31 A429.22
Time

File: 010214P1 Acq: 14-FEB-2001 14:32:45 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 5 Text: P1388_275_002 M23-2 Air Train Vial# 79 File Text: AAP DB5
303.9016 S:5 BSUB(10000,15,-3.0) Expt: OCDD Noise: 149



305.8987 S:5 BSUB(10000,15,-3.0) Expt: OCDD Noise: 279

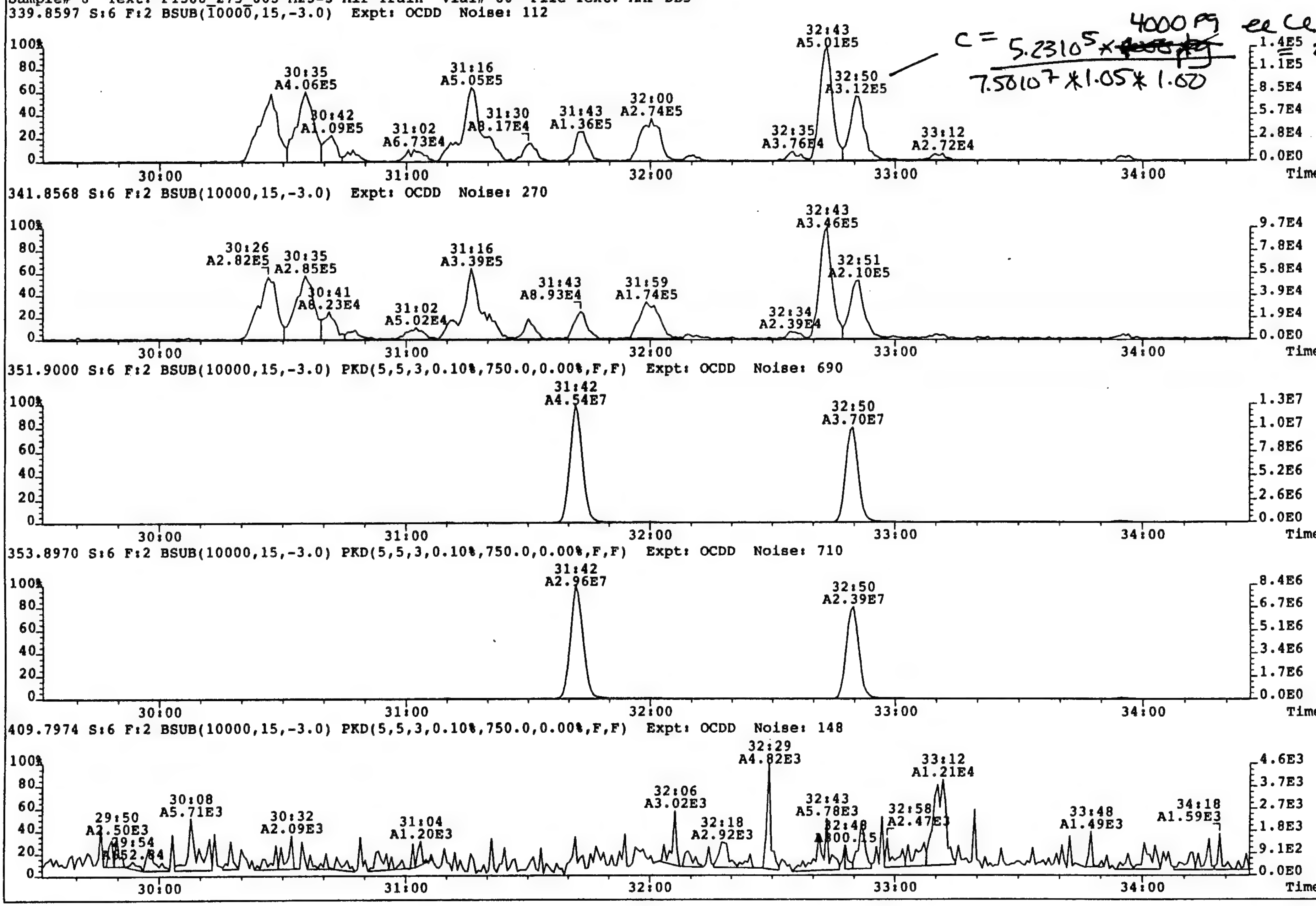


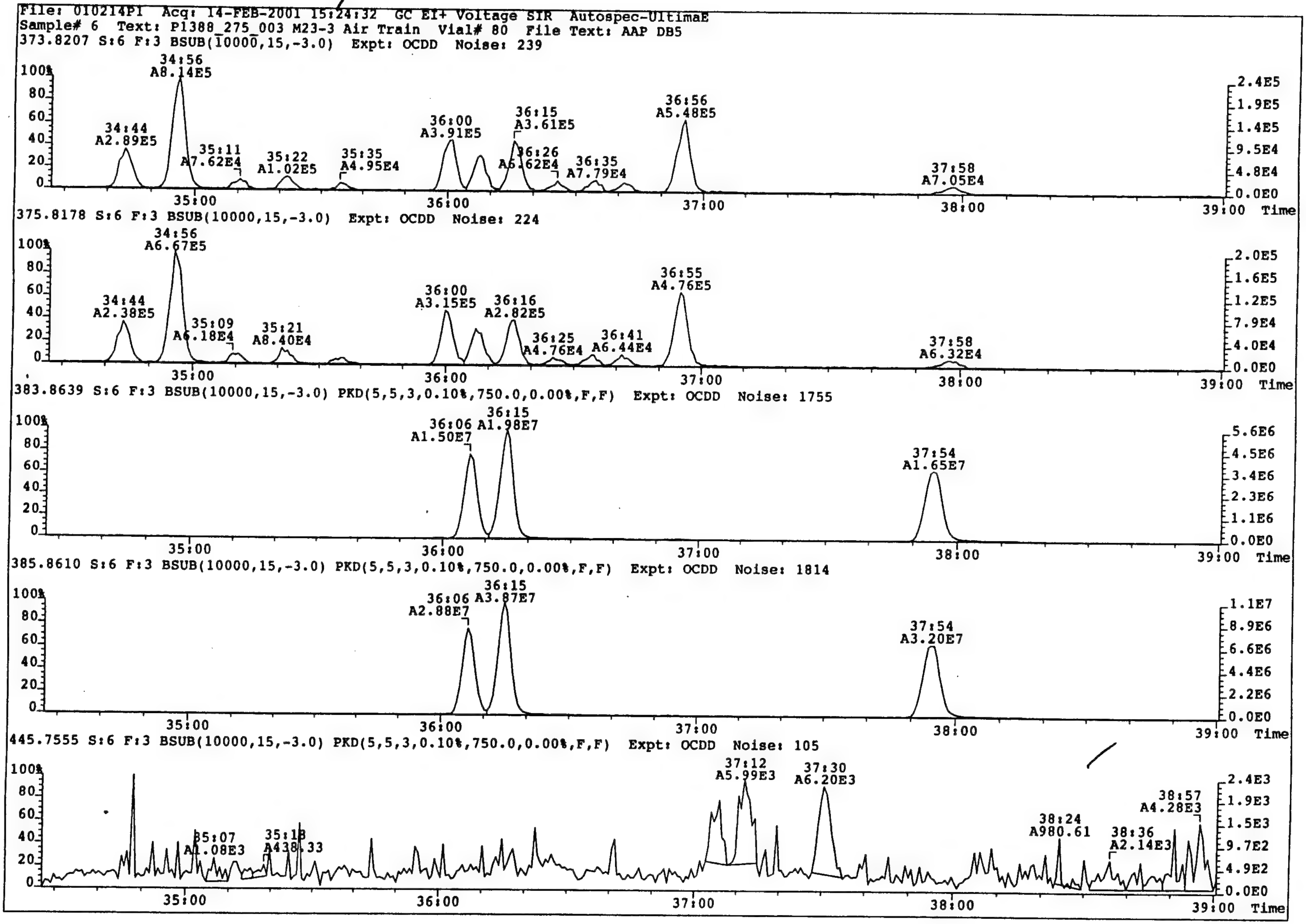
File: 010214P1 Acq: 14-FEB-2001 15:24:32 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 6 Text: P1388_275_003 M23-3 Air Train Vial# 80 File Text: AAP DB5

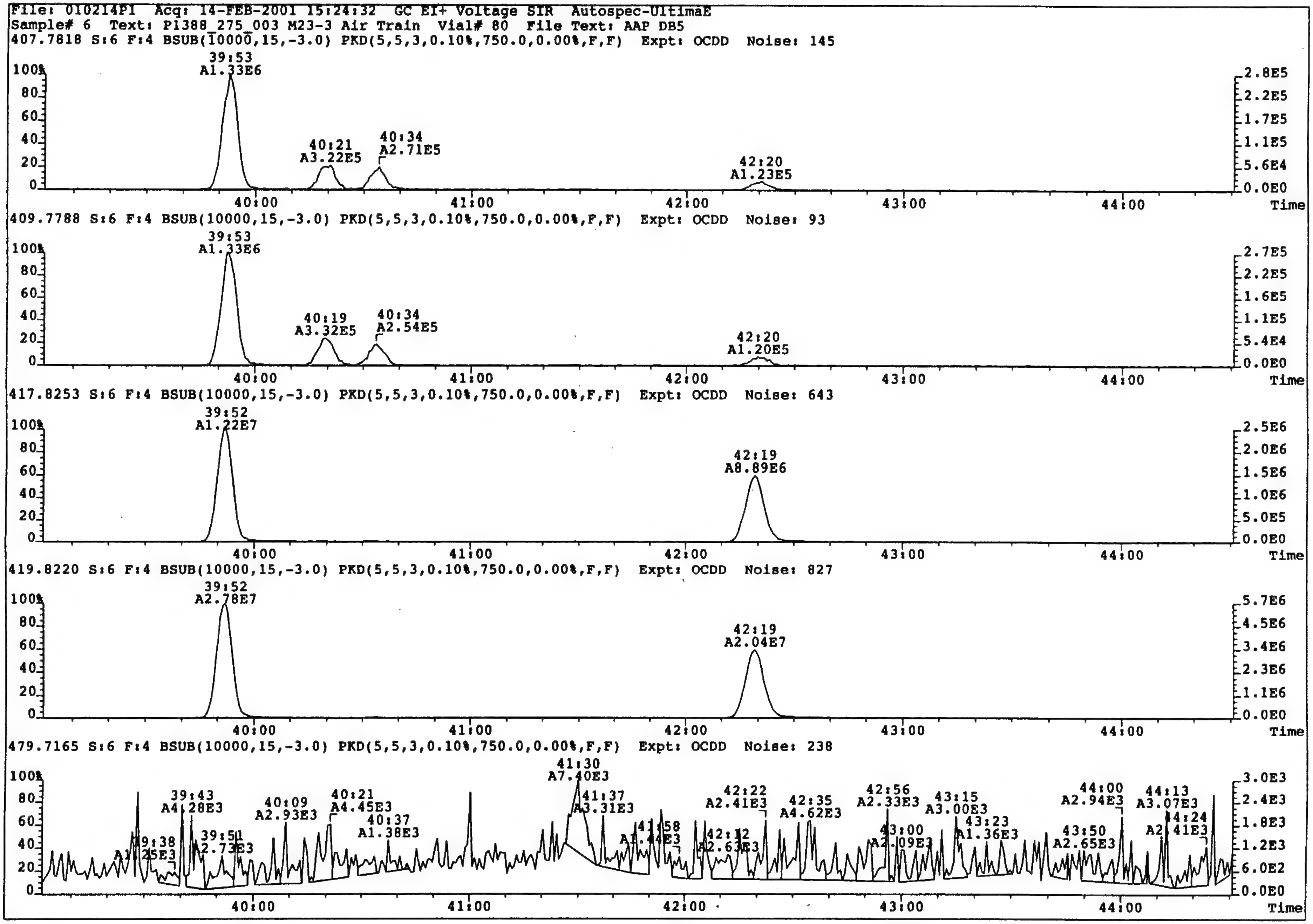
$$C = \frac{5.2310^5 \times 4000\,pg}{7.5010^7 * 1.05 * 1.02} = 26.6$$

ee Ce

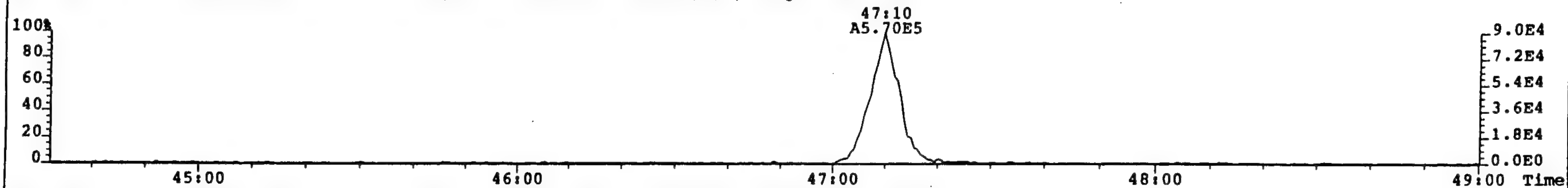
ok



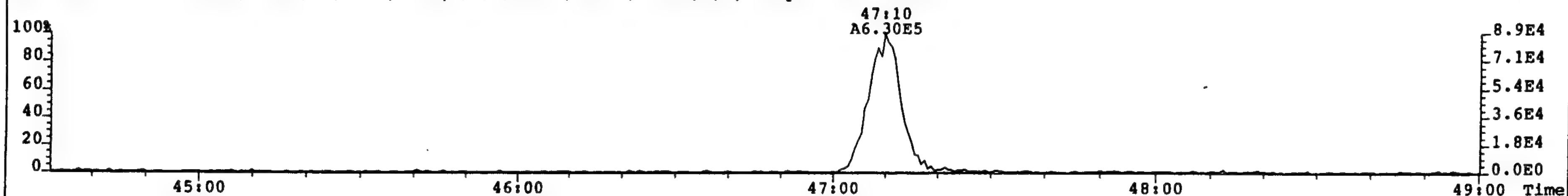

File: 010214P1 Acq: 14-FEB-2001 15:24:32 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 6 Text: P1388_275_003 M23-3 Air Train Vial# 80 File Text: AAP DB5
373.8207 S:6 F:3 BSUB(10000,15,-3.0) Expt: OCDD Noise: 239
34:44 A2.89E5
34:56 A8.14E5
35:11 A7.62E4
35:22 A1.02E5
35:35 A4.95E4
36:00 A3.91E5
36:15 A3.61E5
36:26 A6.62E4
36:35 A7.79E4
36:56 A5.48E5
37:58 A7.05E4
375.8178 S:6 F:3 BSUB(10000,15,-3.0) Expt: OCDD Noise: 224
34:44 A2.38E5
34:56 A6.67E5
35:09 A6.18E4
35:21 A8.40E4
36:00 A3.15E5
36:16 A2.82E5
36:25 A4.76E4
36:41 A6.44E4
36:55 A4.76E5
37:58 A6.32E4
383.8639 S:6 F:3 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 1755
36:06 A1.50E7
36:15 A1.98E7
37:54 A1.65E7
385.8610 S:6 F:3 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 1814
36:06 A2.88E7
36:15 A3.87E7
37:54 A3.20E7
445.7555 S:6 F:3 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 105
35:07 A1.08E3
35:18 A438.33
37:12 A5.99E3
37:30 A6.20E3
38:24 A980.61
38:36 A2.14E3
38:57 A4.28E3
Time


File: 010214P1 Acq: 14-FEB-2001 15:24:32 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 6 Text: P1388_275_003 M23-3 Air Train Vial# 80 File Text: AAP DB5
407.7818 S:6 F:4 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 145
39:53
A1.33E6
40:21
A3.22E5
40:34
A2.71E5
42:20
A1.23E5
409.7788 S:6 F:4 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 93
39:53
A1.33E6
40:19
A3.32E5
40:34
A2.54E5
42:20
A1.20E5
417.8253 S:6 F:4 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 643
39:52
A1.22E7
42:19
A8.89E6
419.8220 S:6 F:4 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 827
39:52
A2.78E7
42:19
A2.04E7
479.7165 S:6 F:4 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 238
41:30
A7.40E3
39:43
A4.28E3
40:09
A2.93E3
40:21
A4.45E3
40:37
A1.38E3
41:37
A3.31E3
42:22
A2.41E3
42:35
A4.62E3
42:56
A2.33E3
43:15
A3.00E3
43:23
A1.36E3
44:00
A2.94E3
44:13
A3.07E3
44:24
43:50
A2.65E3
Time

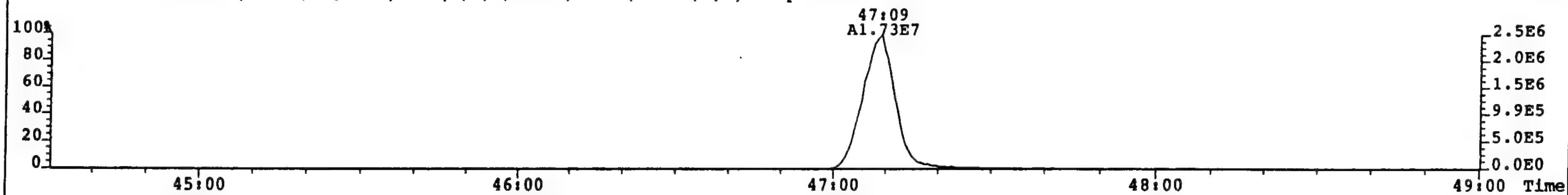
File: 010214P1 Acq: 14-FEB-2001 15:24:32 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 6 Text: P1388_275_003 M23-3 Air Train Vial# 80 File Text: AAP DB5
441.7428 S:6 F:5 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 114



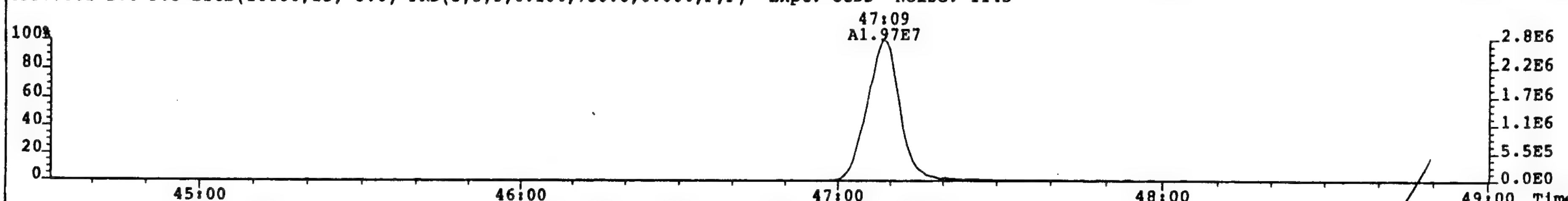
443.7398 S:6 F:5 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 158



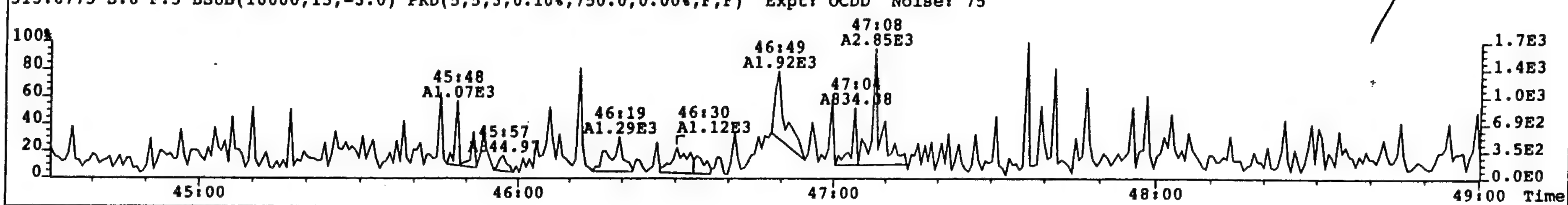
453.7830 S:6 F:5 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 93



455.7801 S:6 F:5 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 1145



513.6775 S:6 F:5 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 75



Alta Analytical Perspectives

Part 4

System Performance

MS & GC

Concal

Documentation for the Analysis

of

Polychlorinated Dibenzo-*p*-Dioxins & Dibenzofurans

PCDD/PCDF CALIBRATION VERIFICATION

Alta Analytical Perspectives

Reviewer: CL

Date: 24 Feb 01

Initial Calibration Date: 10/05/00

Instrument ID: MM-1 GC Column ID: DB-5

VER Data Filename: 010214P1 S#1 Analysis Date: 14-FEB-01 Time: 11:05:47

NATIVE ANALYTES	M/Z'S FORMING RATIO	ION ABUND. RATIO	QC LIMITS	Pass	CONC. FOUND	CONC. RANGE (ng/mL)
2,3,7,8-TCDD	M/M+2	0.77	0.65-0.89	y	5.38	3.75 - 6.25
1,2,3,7,8-PeCDD	M+2/M+4	1.57	1.32-1.78	y	26.24	18.75-31.25
1,2,3,4,7,8-HxCDD	M+2/M+4	1.25	1.05-1.43	y	25.21	18.75-31.25
1,2,3,6,7,8-HxCDD	M+2/M+4	1.24	1.05-1.43	y	25.49	18.75-31.25
1,2,3,7,8,9-HxCDD	M+2/M+4	1.25	1.05-1.43	y	24.67	18.75-31.25
1,2,3,4,6,7,8-HpCDD	M+2/M+4	1.03	0.88-1.20	y	25.05	18.75-31.25
OCDD	M+2/M+4	0.88	0.76-1.02	y	51.12	37 - 65
2,3,7,8-TCDF	M/M+2	0.75	0.65-0.89	y	4.54	3.75 - 6.25
1,2,3,7,8-PeCDF	M+2/M+4	1.53	1.32-1.78	y	23.76	18.75-31.25
2,3,4,7,8-PeCDF	M+2/M+4	1.54	1.32-1.78	y	23.32	18.75-31.25
1,2,3,4,7,8-HxCDF	M+2/M+4	1.23	1.05-1.43	y	24.39	18.75-31.25
1,2,3,6,7,8-HxCDF	M+2/M+4	1.19	1.05-1.43	y	24.08	18.75-31.25
2,3,4,6,7,8-HxCDF	M+2/M+4	1.23	1.05-1.43	y	24.18	18.75-31.25
1,2,3,7,8,9-HxCDF	M+2/M+4	1.25	1.05-1.43	y	24.51	18.75-31.25
1,2,3,4,6,7,8-HpCDF	M+2/M+4	1.02	0.88-1.20	y	23.56	18.75-31.25
1,2,3,4,7,8,9-HpCDF	M+2/M+4	1.02	0.88-1.20	y	23.07	18.75-31.25
OCDF	M+2/M+4	0.89	0.76-1.02	y	47.99	35 - 65

Analyst: GAB

Date: 20 Feb 01

PCDD/PCDF CALIBRATION VERIFICATION

Alta Analytical Perspectives

Reviewer: CL

Date: 24 Feb01

Initial Calibration Date: 10/05/00

Instrument ID: MM-1 GC Column ID: DB-5

VER Data Filename: 010214P1 S#1 Analysis Date: 14-FEB-01 Time: 11:05:47

LABELED COMPOUNDS	M/Z'S FORMING RATIO	ION ABUND. RATIO	QC LIMITS	Pass	CONC. FOUND	CONC. RANGE (ng/mL)
13C-2,3,7,8-TCDD	M/M+2	0.78	0.65-0.89	y	93.7	70.0 - 130.0
13C-1,2,3,7,8-PeCDD	M+2/M+4	1.57	1.32-1.78	y	99.6	70.0 - 130.0
13C-1,2,3,6,7,8-HxCDD	M+2/M+4	1.23	1.05-1.43	y	97.7	70.0 - 130.0
13C-1,2,3,4,6,7,8-HpCDD	M+2/M+4	1.03	0.88-1.20	y	92.1	70.0 - 130.0
13C-OCDD	M+2/M+4	0.89	0.76-1.02	y	93.3	70.0 - 130.0
13C-2,3,7,8-TCDF	M/M+2	0.77	0.65-0.89	y	92.9	70.0 - 130.0
13C-1,2,3,7,8-PeCDF	M+2/M+4	1.54	1.32-1.78	y	94.5	70.0 - 130.0
13C-1,2,3,6,7,8-HxCDF	M/M+2	0.52	0.43-0.59	y	82.8	70.0 - 130.0
13C-1,2,3,4,6,7,8-HpCDF	M/M+2	0.44	0.37-0.51	y	83.3	70.0 - 130.0
13C-OCDF	M+2/M+4	0.89	0.76-1.02	y	87.3	70.0 - 130.0
37Cl-2,3,7,8-TCDD					103.3	75.0 - 125.0
13C-2,3,4,7,8-PeCDF	M+2/M+4	1.55	1.32-1.78	y	101.3	75.0 - 125.0
13C-1,2,3,4,7,8-HxCDD	M+2/M+4	1.29	1.05-1.43	y	100.7	75.0 - 125.0
13C-1,2,3,4,7,8-HxCDF	M/M+2	0.52	0.43-0.59	y	104.1	75.0 - 125.0
13C-1,2,3,4,7,8,9-HpCDF	M/M+2	0.43	0.37-0.51	y	99.9	75.0 - 125.0
13C-1,2,3,7,8,9-HxCDF	M/M+2	0.52	0.43-0.59	y	86.8	75.0 - 125.0

Analyst: GAG

Date: 20 Feb01

Client ID: DB5 CPSM / M23 CS3 Filename: 010214P1 S: 1 Acq: 14-FEB-01 11:05:47 ConCal: 010214P1-
Lab ID: CS3RC GC Column ID: db-5 ICal: MM1_M23_0: Wt/vol: 1.000 EndCal: 010214P1-

	Name	Resp	RA	RRF	RT	Conc	Qualif.	CDE	noise	Fac	DL	EMPC / Rec
	2,3,7,8-TCDD	4.34e+06	0.77 y	1.26	27:45	5.38			1127	2.5	0.0253	
	1,2,3,7,8-PeCDD	1.47e+07	1.57 y	1.01	33:12	26.2			1019	2.5	0.0434	
	1,2,3,4,7,8-HxCDD	1.40e+07	1.25 y	1.14	37:06	25.2			2400	2.5	0.0945	
	1,2,3,6,7,8-HxCDD	1.27e+07	1.24 y	1.02	37:13	25.5			2400	2.5	0.105	
	1,2,3,7,8,9-HxCDD	1.37e+07	1.25 y	1.14	37:32	24.7			2400	2.5	0.0942	
	1,2,3,4,6,7,8-HpCDD	1.26e+07	1.03 y	1.13	41:31	25.0			2426	2.5	0.137	
	OCDD	1.92e+07	0.88 y	1.03	46:51	51.1			1515	2.5	0.139	
	2,3,7,8-TCDF	3.83e+06	0.75 y	1.05	26:51	4.54			2169	2.5	0.0492	
	1,2,3,7,8-PeCDF	1.83e+07	1.53 y	1.04	31:43	23.8			1447	2.5	0.0435	
	2,3,4,7,8-PeCDF	1.82e+07	1.54 y	1.05	32:51	23.3			1447	2.5	0.0428	
	1,2,3,4,7,8-HxCDF	1.57e+07	1.23 y	1.13	36:08	24.4			2488	2.5	0.0544	
	1,2,3,6,7,8-HxCDF	1.69e+07	1.19 y	1.24	36:16	24.1			2488	2.5	0.0498	
	2,3,4,6,7,8-HxCDF	1.60e+07	1.23 y	1.16	36:55	24.2			2488	2.5	0.0529	
	1,2,3,7,8,9-HxCDF	1.42e+07	1.25 y	1.02	37:56	24.5			2488	2.5	0.0605	
	1,2,3,4,6,7,8-HpCDF	1.46e+07	1.02 y	1.54	39:53	23.6			2715	2.5	0.0755	
	1,2,3,4,7,8,9-HpCDF	1.20e+07	1.02 y	1.30	42:20	23.1			2715	2.5	0.0896	
	OCDF	2.08e+07	0.89 y	1.15	47:10	48.0			1591	2.5	0.122	
												EMPC
	Total Tetra-Dioxins	1.74e+07	0.80 y	1.26	24:00	21.6			1127	2.5	0.0253	21.7
	Total Penta-Dioxins	3.92e+07	1.53 y	1.01	30:39	69.9			1019	2.5	0.0434	70.0
	Total Hexa-Dioxins	4.19e+07	1.26 y	1.10	35:24	78.0			2400	2.5	0.0977	78.5
	Total Hepta-Dioxins	2.32e+07	1.03 y	1.13	40:19	46.0			2426	2.5	0.137	46.3
	Total Tetra-Furans	9.58e+06	0.75 y	1.05	21:50	11.3			2169	2.5	0.0492	11.5
	1st Fnc. Penta-Furans	1.76e+07	1.58 y	1.05	28:51	22.6			2634	2.5	0.0785	22.6
	Total Penta-Furans	5.17e+07	1.53 y	1.05	31:43	66.6			1447	2.5	0.0431	
	PeCDF Totals:					89.3						89.5
	Total Hexa-Furans	6.46e+07	1.24 y	1.14	34:44	100			2488	2.5	0.0541	100
	Total Hepta-Furans	2.67e+07	1.02 y	1.42	39:53	46.8			2715	2.5	0.0819	47.1
												Rec
IS	13C-2,3,7,8-TCDD	6.40e+07	0.78 y	1.13	27:43	93.7						93.7
IS	13C-1,2,3,7,8-PeCDD	5.54e+07	1.57 y	0.93	33:11	99.6						99.6
IS	13C-1,2,3,6,7,8-HxCDD	4.87e+07	1.23 y	0.93	37:12	97.7						97.7
IS	13C-1,2,3,4,6,7,8-HpCDD	4.46e+07	1.03 y	0.91	41:30	92.1						92.1
IS	13C-OCDD	3.66e+07	0.89 y	0.73	46:50	93.3						93.3
IS	13C-2,3,7,8-TCDF	8.07e+07	0.77 y	1.06	26:50	92.9						92.9
IS	13C-1,2,3,7,8-PeCDF	7.42e+07	1.54 y	0.96	31:42	94.5						94.5
IS	13C-1,2,3,6,7,8-HxCDF	5.67e+07	0.52 y	1.28	36:15	82.8						82.8
IS	13C-1,2,3,4,6,7,8-HpCDF	4.02e+07	0.44 y	0.90	39:52	83.3						83.3
IS	13C-OCDF	3.78e+07	0.89 y	0.81	47:09	87.3						87.3
RS/RT	13C-1,2,3,4-TCDD	6.02e+07	0.79 y	1.00	27:03	100						-
RS	13C-1,2,3,4-TCDF	8.20e+07	0.77 y	1.00	25:27	100						-
RS/RT	13C-1,2,3,7,8,9-HxCDD	5.34e+07	1.23 y	1.00	37:31	100						-
PS	37Cl-2,3,7,8-TCDD	3.40e+07		0.51	27:45	103						103
PS	13C-2,3,4,7,8-PeCDF	7.32e+07	1.55 y	0.97	32:50	101						101
PS	13C-1,2,3,4,7,8-HxCDD	4.53e+07	1.29 y	0.92	37:05	101						101
PS	13C-1,2,3,4,7,8-HxCDF	5.37e+07	0.52 y	0.91	36:06	104						104
PS	13C-1,2,3,4,7,8,9-HpCDF	3.43e+07	0.43 y	0.85	42:20	99.9						99.9
AS	13C-1,2,3,7,8,9-HxCDF	4.96e+07	0.52 y	1.07	37:55	86.8						86.8

Reviewer: Ce
Date: 24 Feb 01

Analyst: GAG
Date: 20 Feb 01

FORM 5
PCDD/PCDF RT WINDOW AND ISOMER SPECIFICITY STANDARDS

Lab Name: Alta Analytical Perspectives Episode No.:

Contract No.: SAS No.:

Reviewer: ce

Instrument ID: MM-1 Initial Calibration Date: 10/5/00

RT Window Data Filename: 010214P1 S#1 Analysis Date: 14-FEB-01 Time: 11:05:47

Date: 24 Feb 01

DB-5 IS Data Filename: 010214P1 S#1 Analysis Date: 14-FEB-01 Time: 11:05:47

DB_225 IS Data Filename: Analysis Date: Time:

DB-5 RT WINDOW DEFINING STANDARDS RESULTS

ISOMERS	ABSOLUTE RT	ISOMERS	ABSOLUTE RT
1,3,6,8-TCDD (F)	24:00	1,3,6,8-TCDF (F)	21:50
1,2,8,9-TCDD (L)	28:45	1,2,8,9-TCDF (L)	28:54
1,2,4,7,9-PeCDD (F)	30:39	1,3,4,6,8-PeCDF (F)	28:51
1,2,3,8,9-PeCDD (L)	33:39	1,2,3,8,9-PeCDF (L)	33:56
1,2,4,6,7,9-HxCDD (F)	35:24	1,2,3,4,6,8-HxCDF (F)	34:44
1,2,3,7,8,9-HxCDD (L)	37:32	1,2,3,7,8,9-HxCDF (L)	37:56
1,2,3,4,6,7,9-HpCDD (F)	40:19	1,2,3,4,6,7,8-HpCDF (F)	39:53
1,2,3,4,6,7,8-HpCDD (L)	41:31	1,2,3,4,7,8,9-HpCDF (L)	42:20

(F) = First eluting isomer (DB-5); (L) = Last eluting isomer (DB-5).

==

ISOMER SPECIFICITY (IS) TEST STANDARD RESULTS

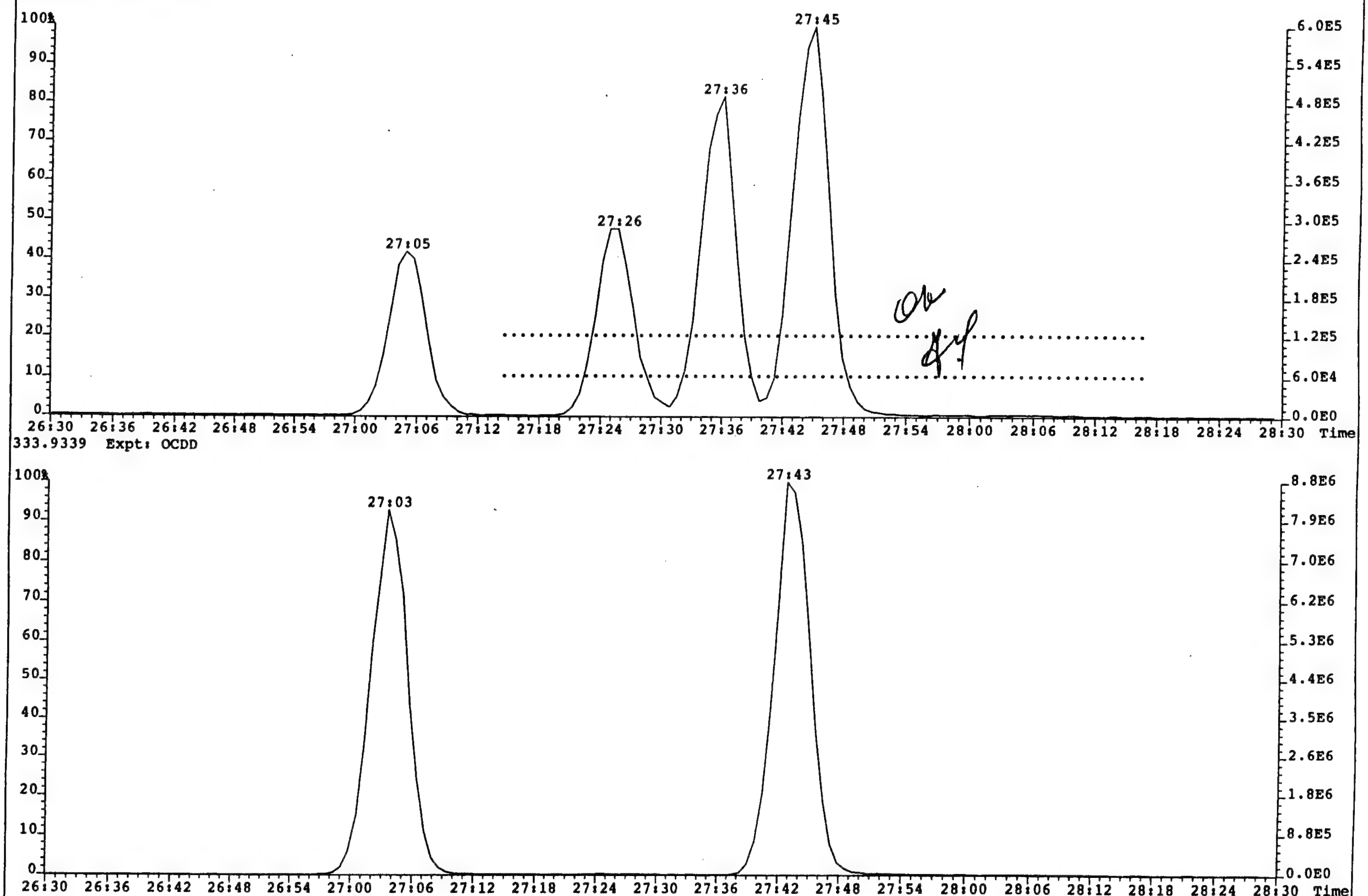
% VALLEY HEIGHT
BETWEEN
COMPARED PEAKS (1)

<25%

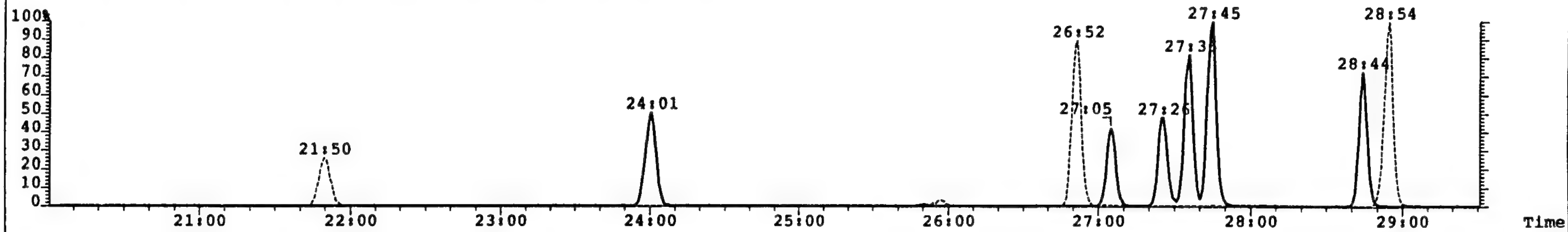
Analyst: GAG

Date: 20 Feb 01

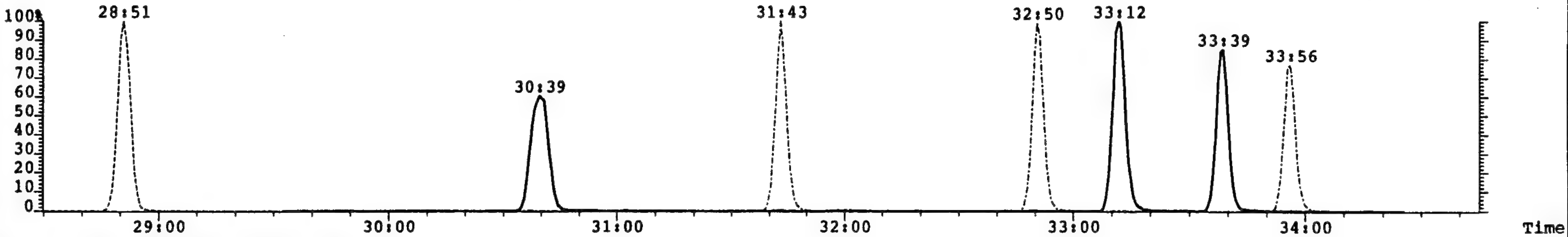
File: 010214P1 Acq: 14-FEB-2001 11:05:47 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 1 Text: DB5 CPSM / M23 CS3 Vial# 3 File Text: AAP DB5
321.8936 Expt: OCDD



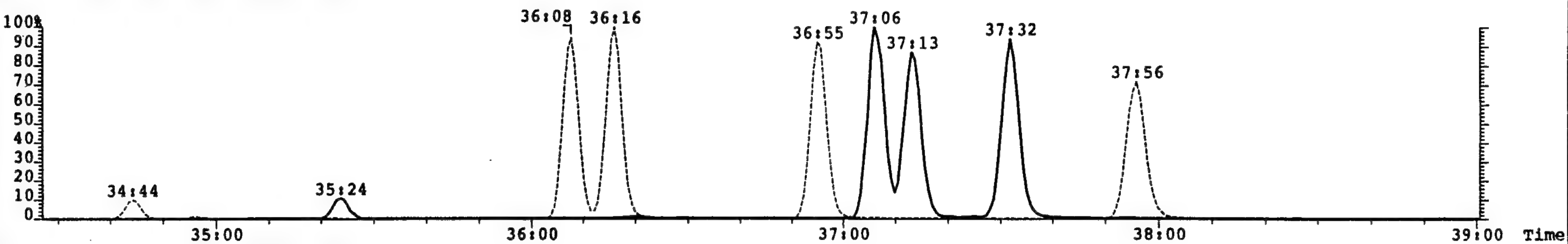
File: 010214P1 Acq: 14-FEB-2001 11:05:47 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 1 Text: DB5 CPSM / M23 CS3 Vial# 3 File Text: AAP DB5
305.8987,321.8936 Expt: OCDD



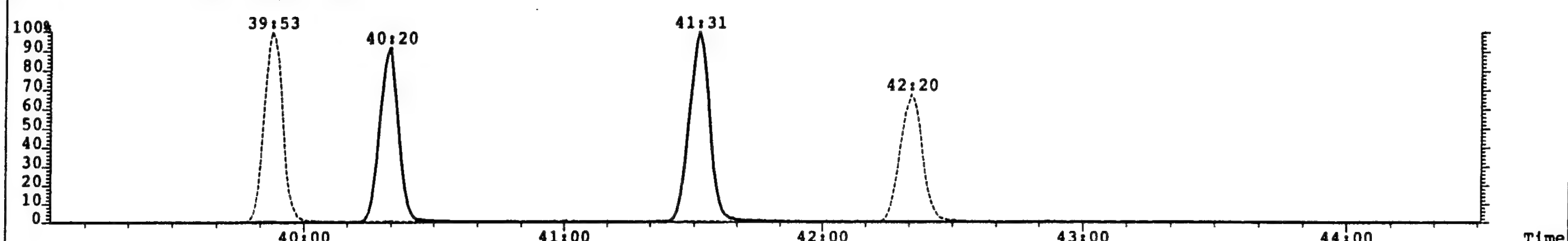
339.8597,355.8546 F:2,339.8597 F:2 Expt: OCDD



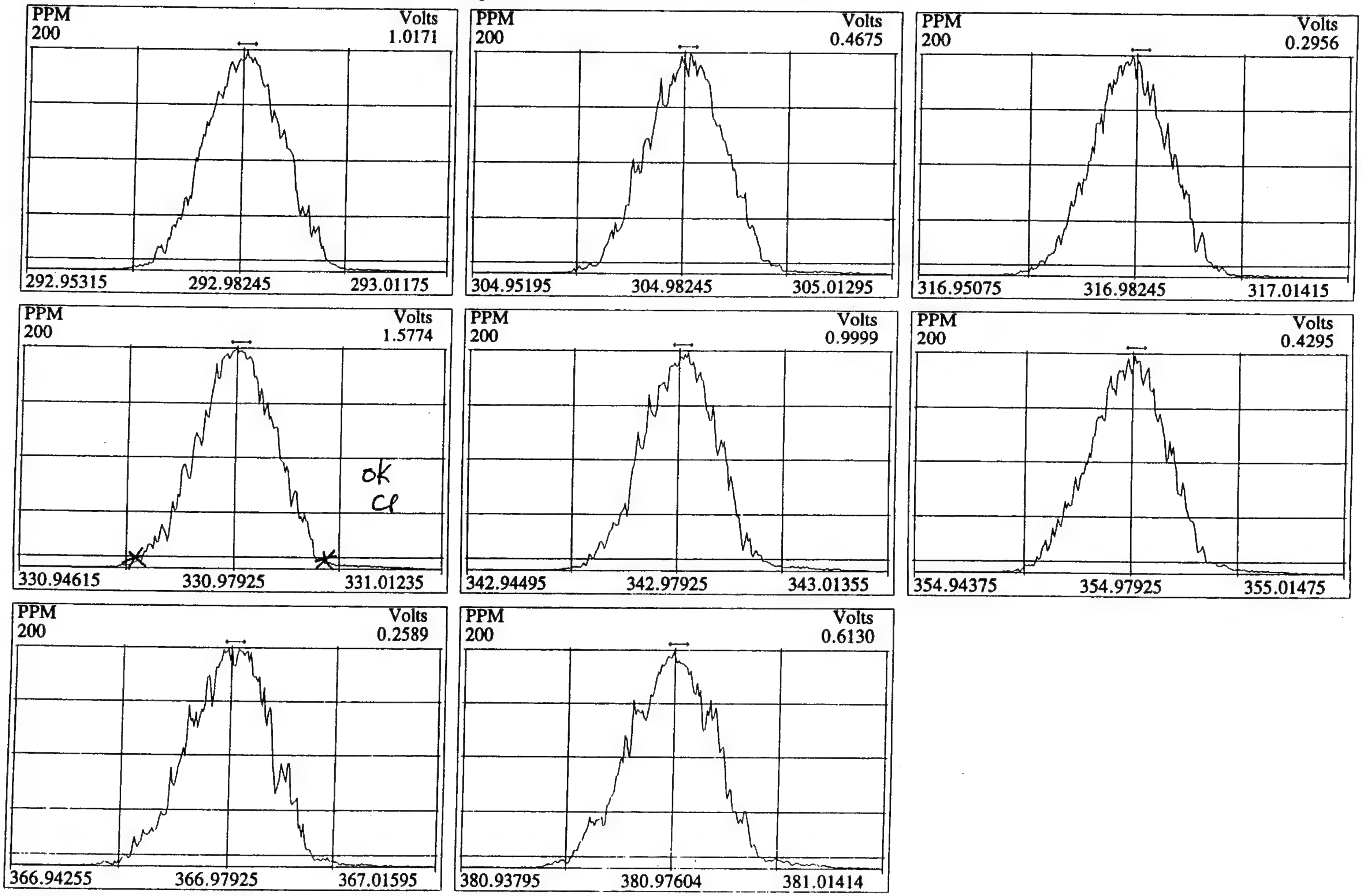
F:3 373.8207,389.8156 Expt: OCDD



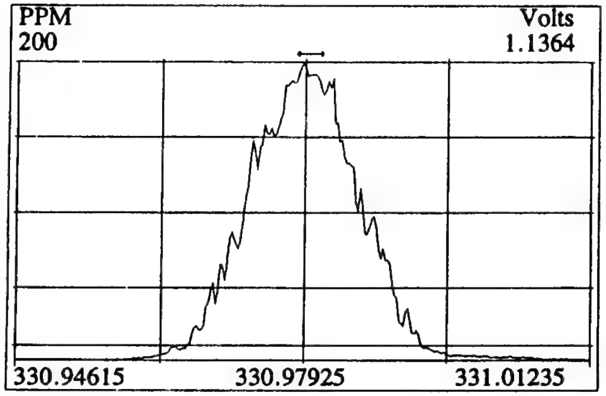
F:4 407.7818,423.7767 Expt: OCDD

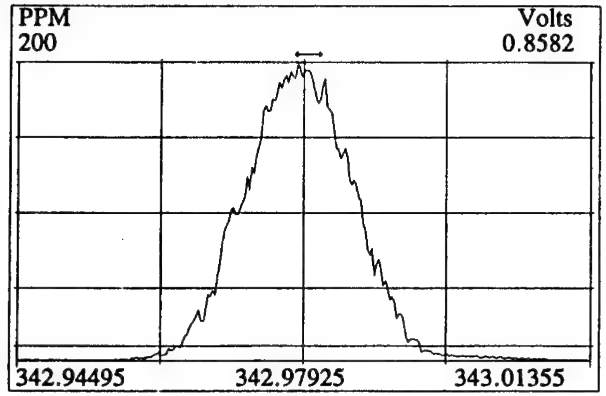


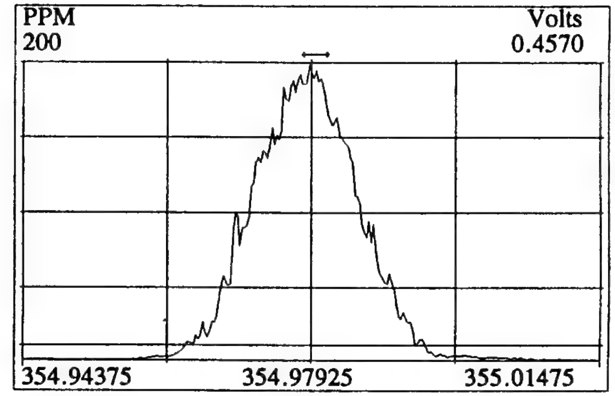
Peak Locate Examination:14-FEB-2001:11:02 File:010214P1
Experiment:OCDD Function:1 Reference:PFK2

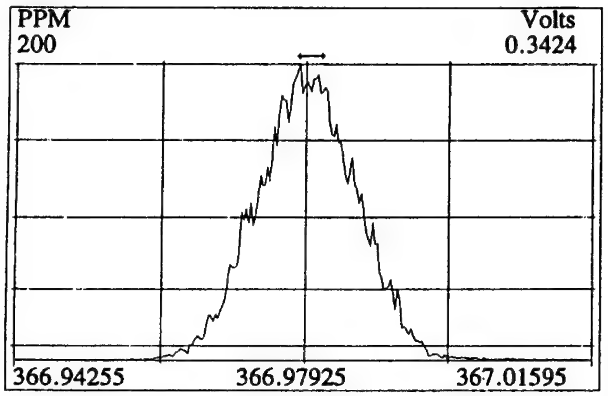


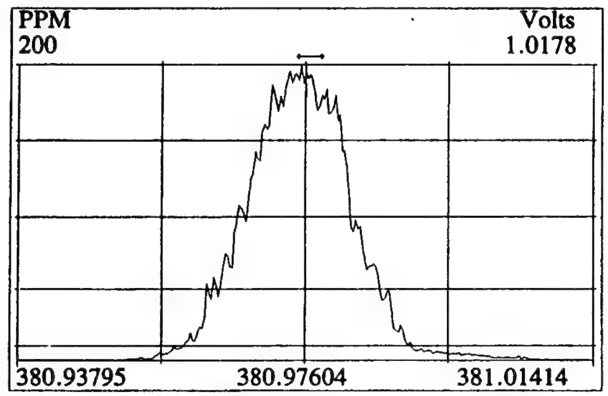
Peak Locate Examination:14-FEB-2001:11:02 File:010214P1
Experiment:OCDD Function:2 Reference:PFK2

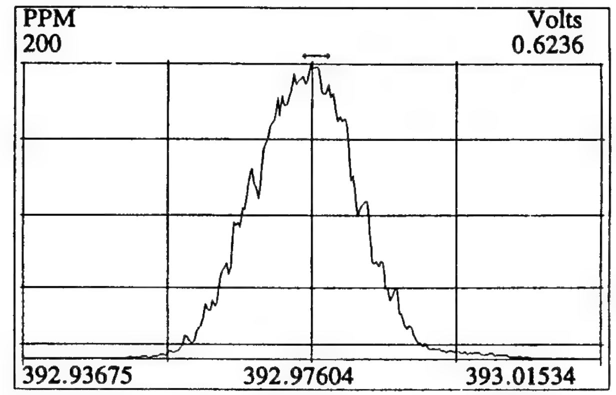


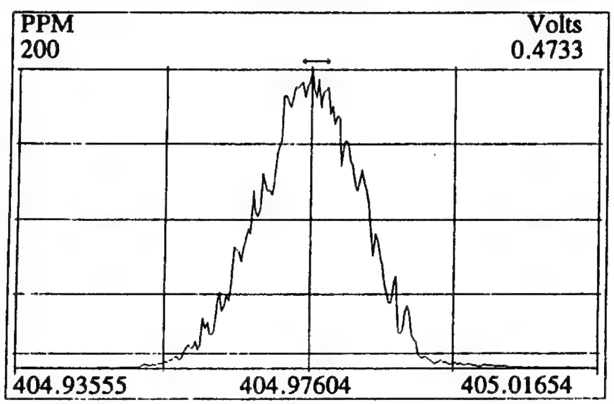


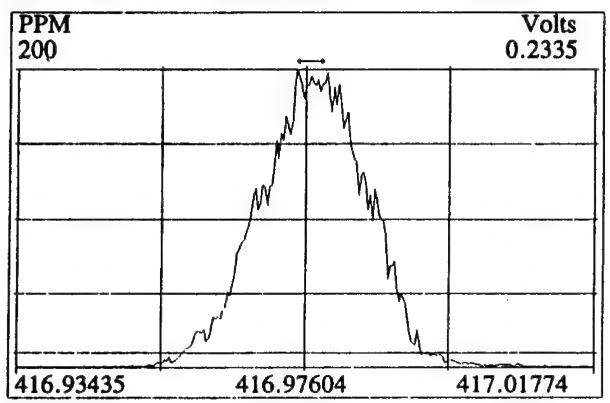




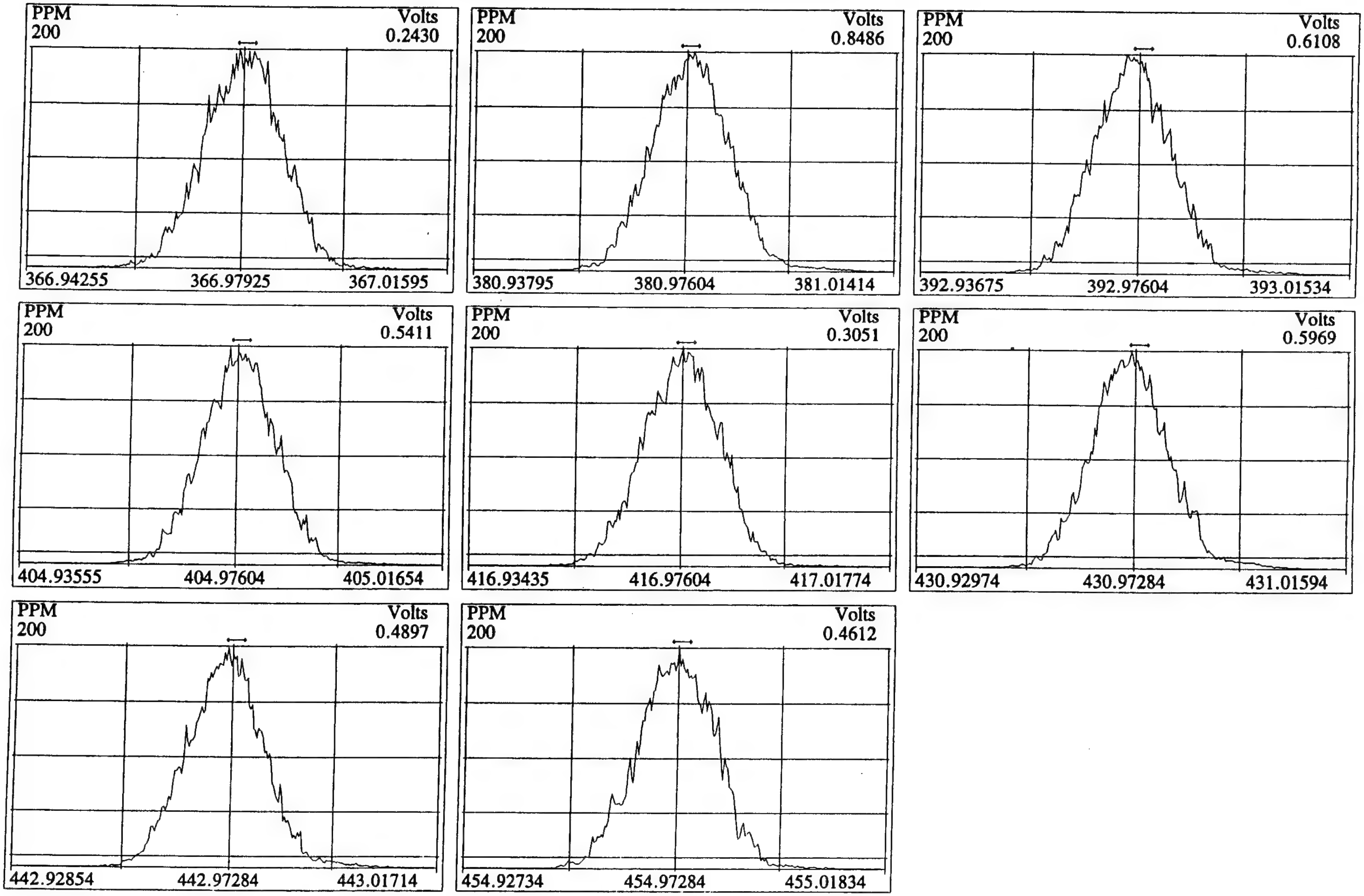




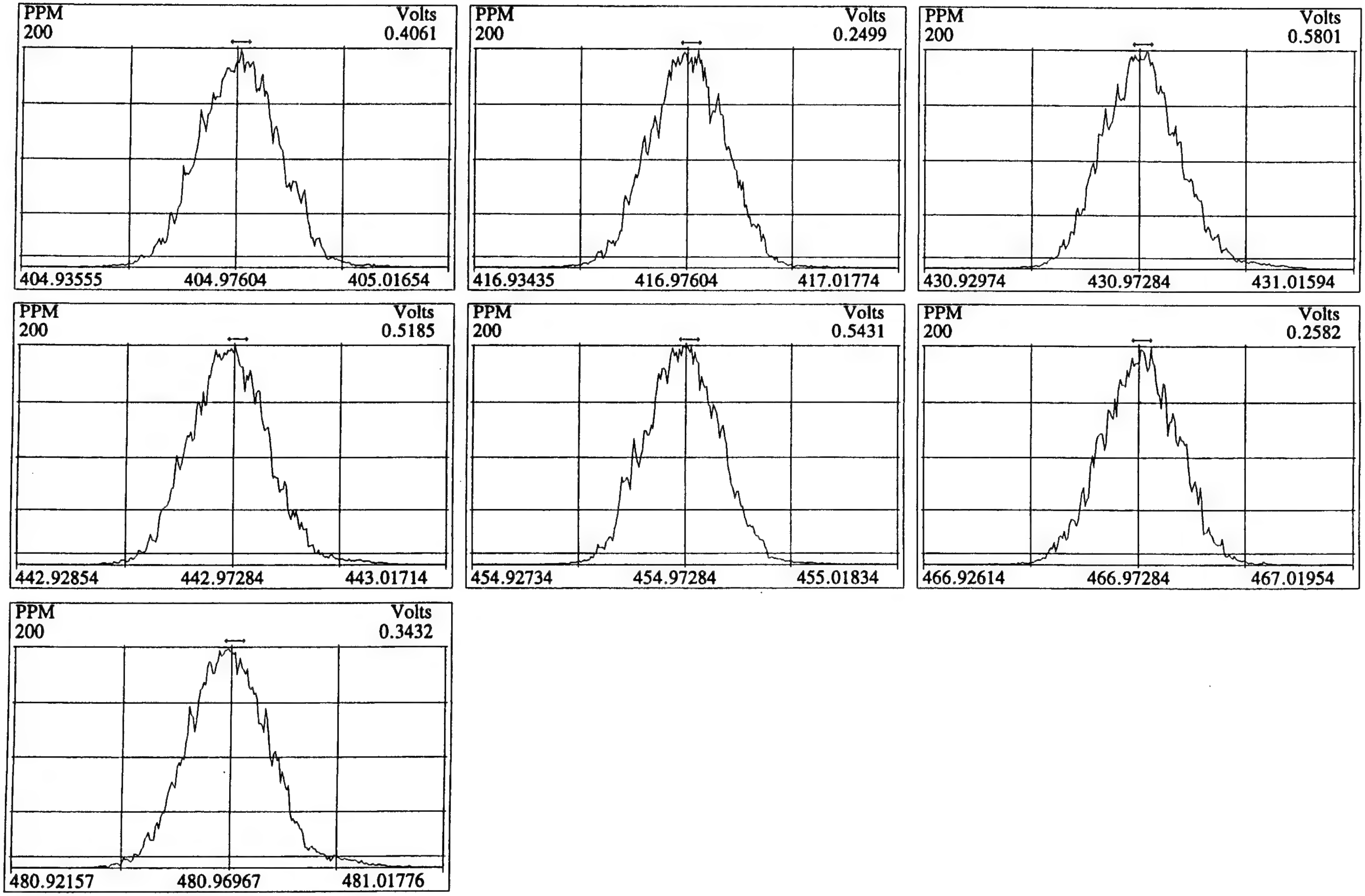




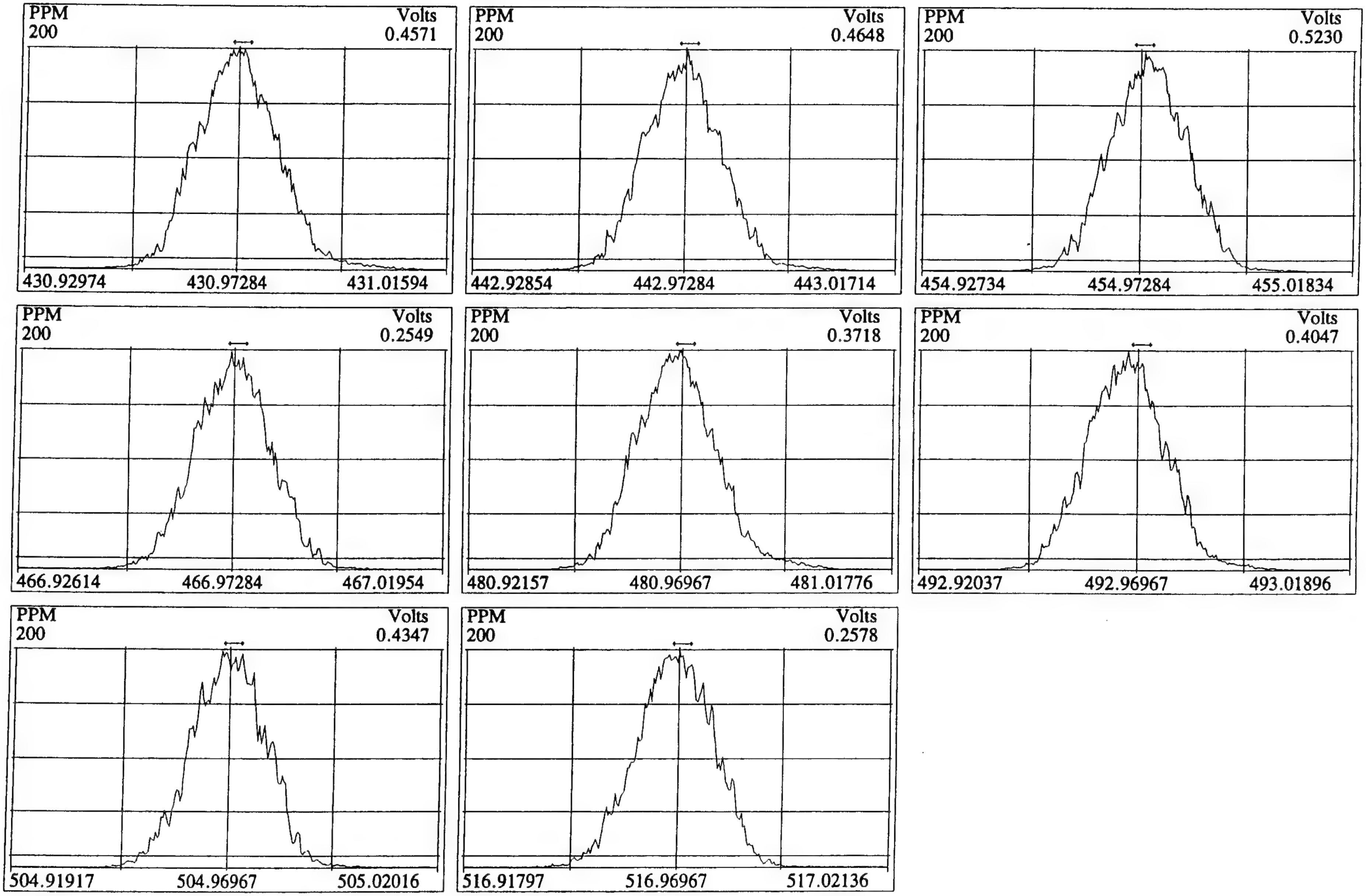
Peak Locate Examination:14-FEB-2001:11:03 File:010214P1
Experiment:OCDD Function:3 Reference:PFK2



Peak Locate Examination:14-FEB-2001:11:04 File:010214P1
Experiment:OCDD Function:4 Reference:PFK2

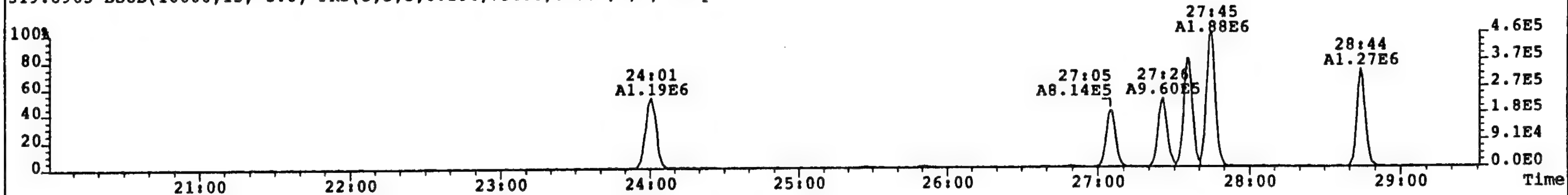


Peak Locate Examination:14-FEB-2001:11:04 File:010214P1
Experiment:OCDD Function:5 Reference:PFK2

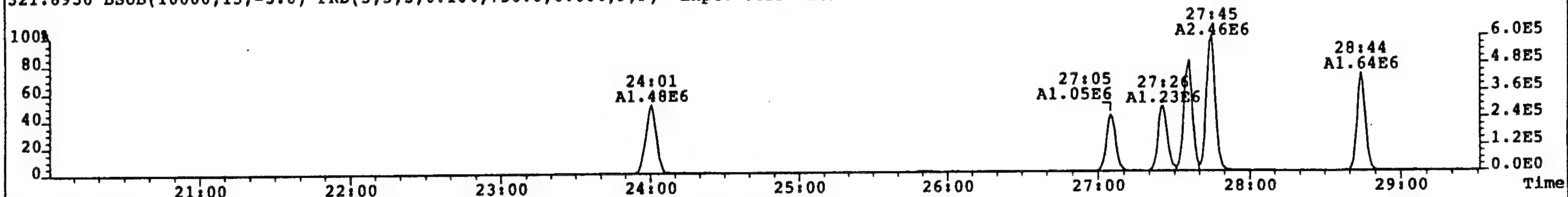


File: 010214P1 Acq: 14-FEB-2001 11:05:47 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 1 Text: DB5 CPSM / M23 CS3 Vial# 3 File Text: AAP DB5

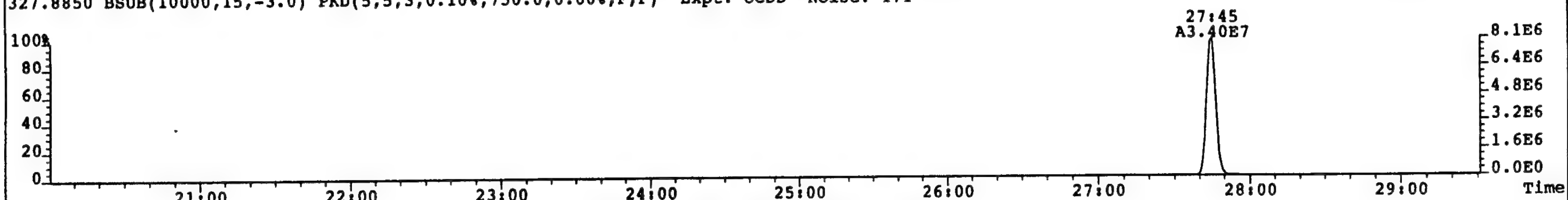
319.8965 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 243



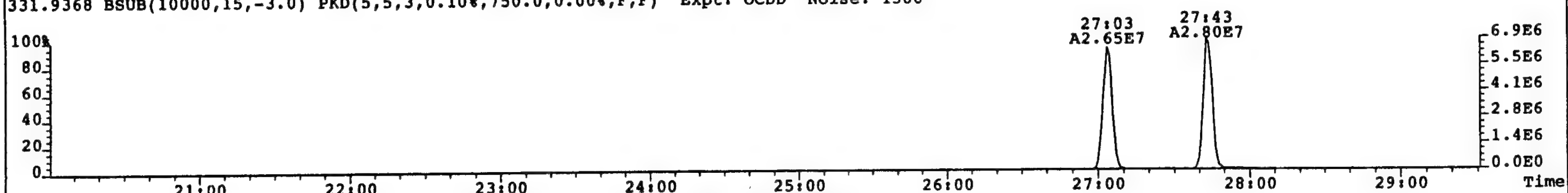
321.8936 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 124



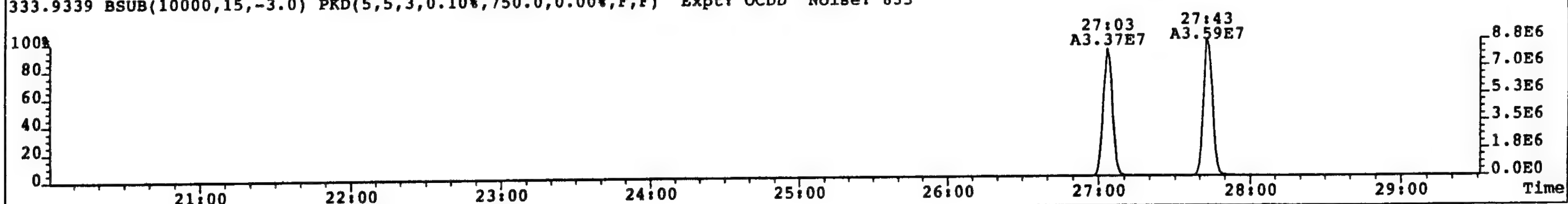
327.8850 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 171

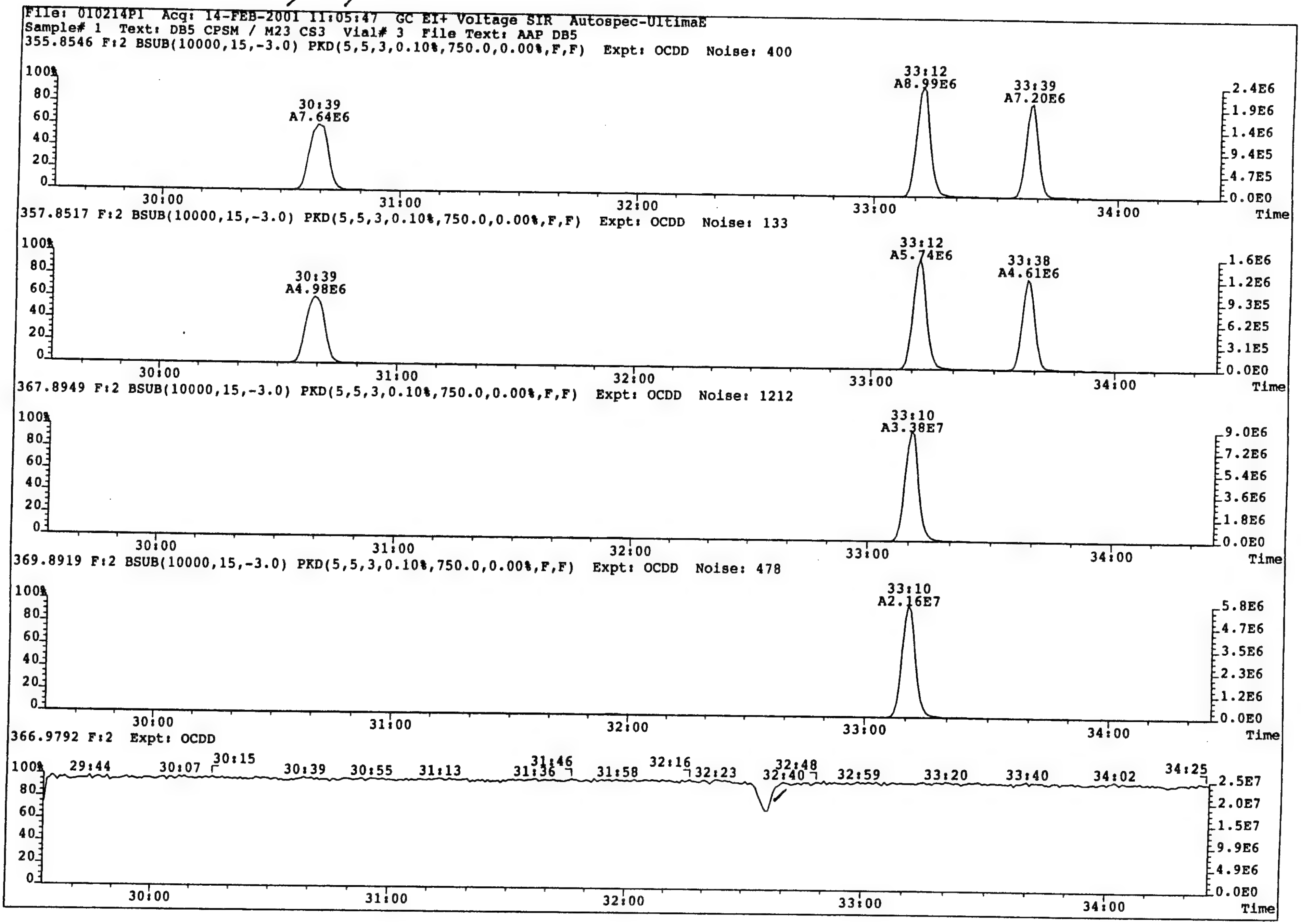


331.9368 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 1588

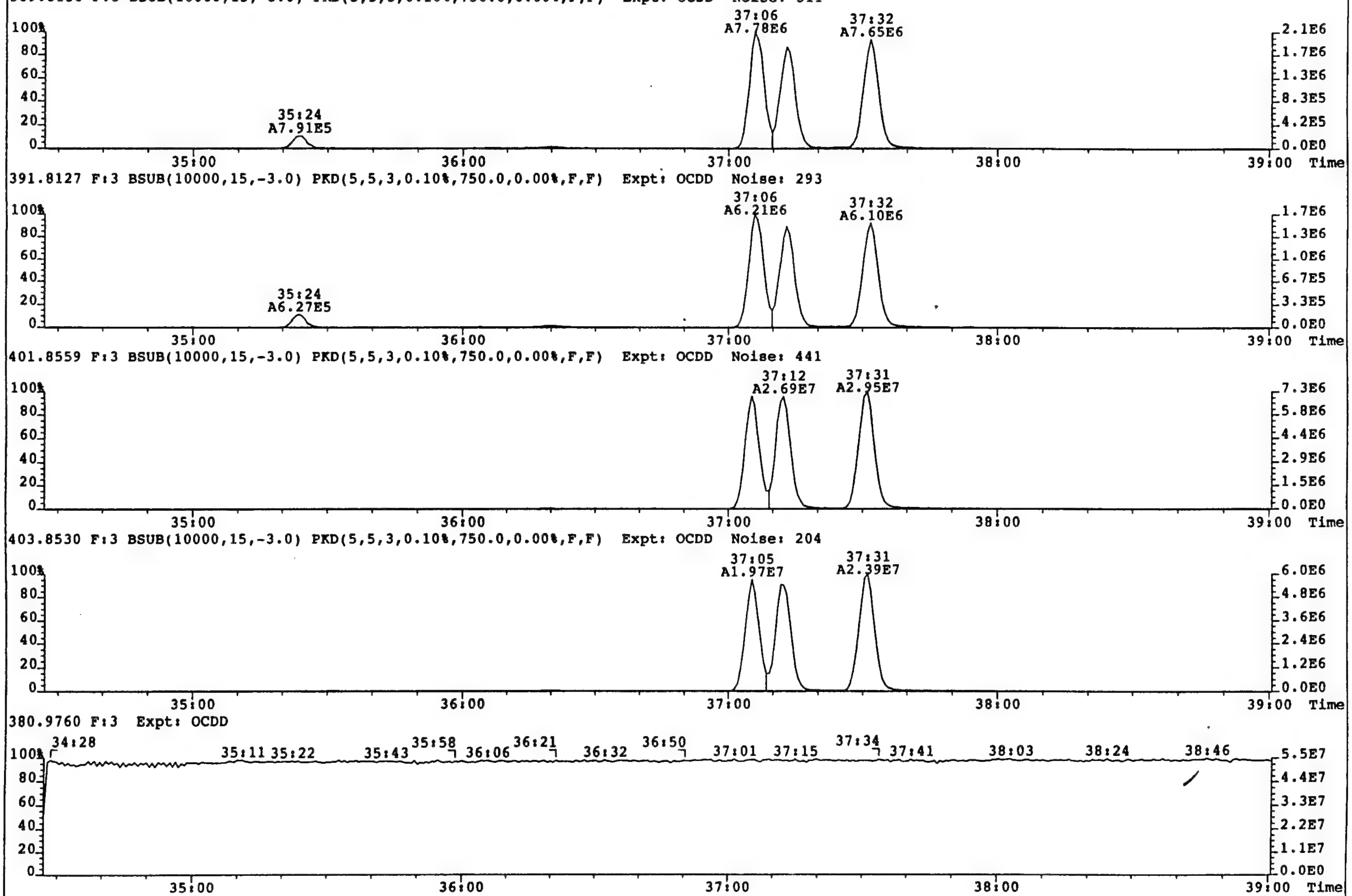


333.9339 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 835

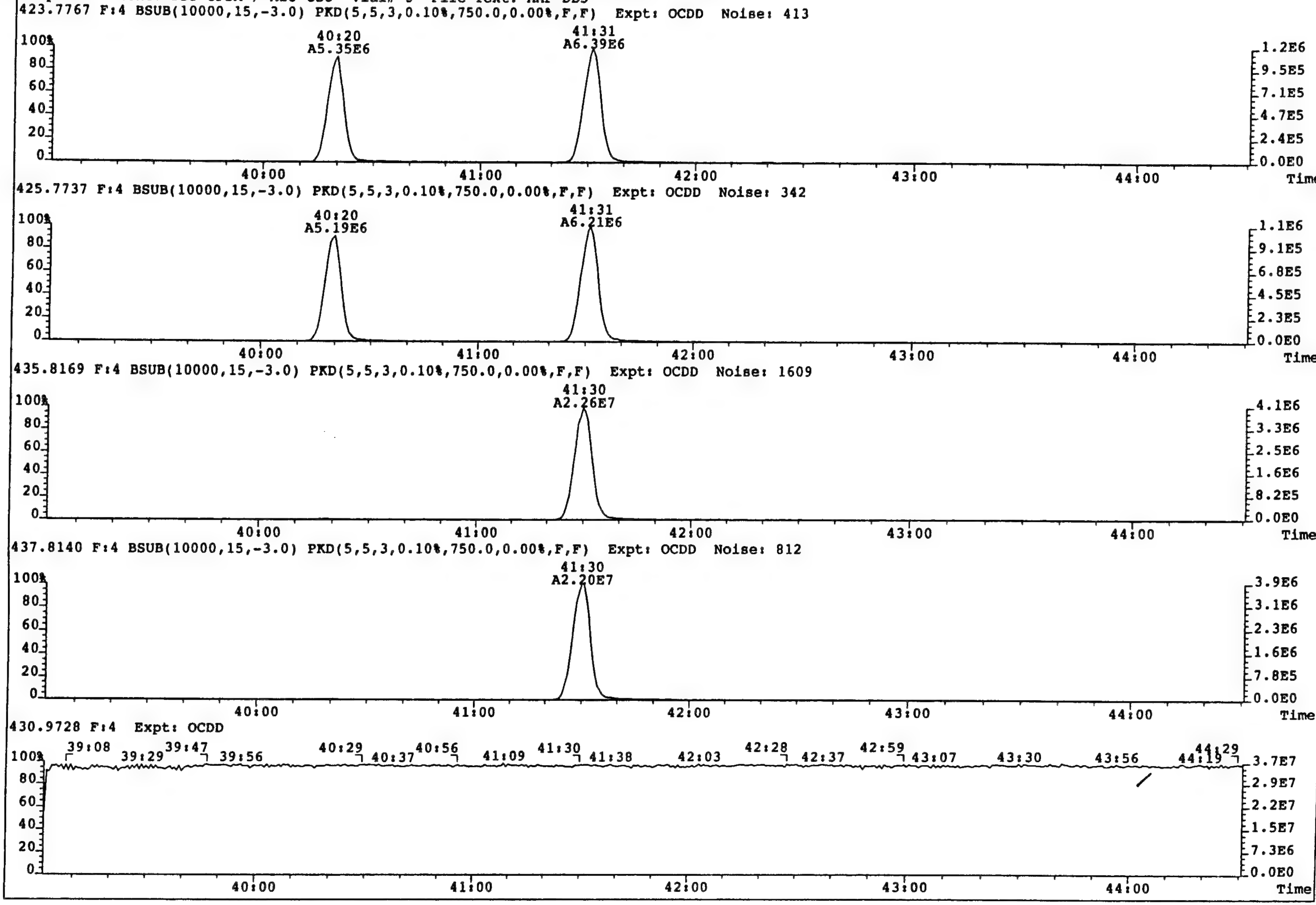


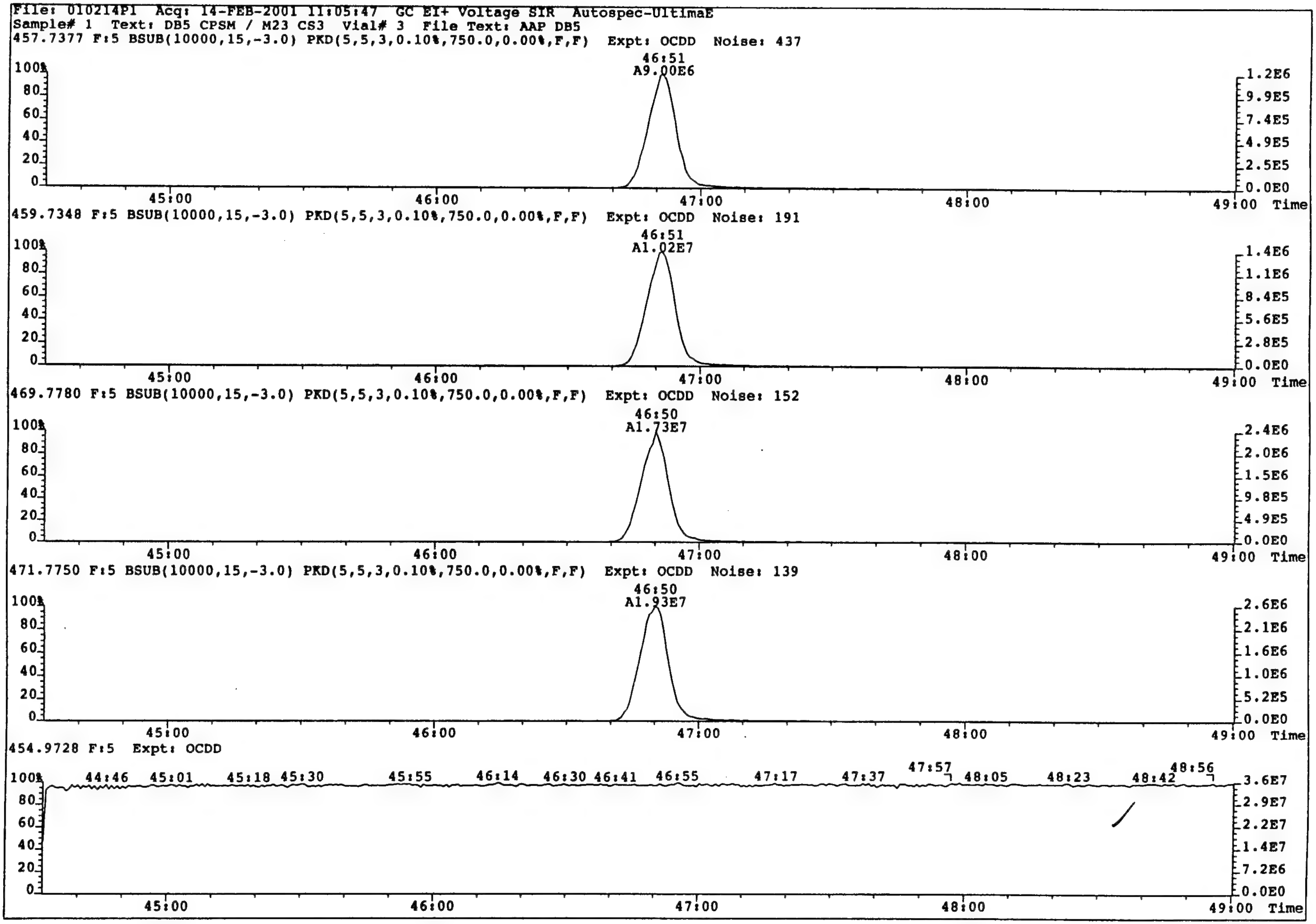

File: 010214P1 Acq: 14-FEB-2001 11:05:47 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 1 Text: DB5 CPSM / M23 CS3 Vial# 3 File Text: AAP DB5
355.8546 F:2 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 400
30:39
A7.64E6
33:12
A8.99E6
33:39
A7.20E6
2.4E6
1.9E6
1.4E6
9.4E5
4.7E5
0.0E0
357.8517 F:2 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 133
30:39
A4.98E6
33:12
A5.74E6
33:38
A4.61E6
1.6E6
1.2E6
9.3E5
6.2E5
3.1E5
0.0E0
367.8949 F:2 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 1212
33:10
A3.38E7
9.0E6
7.2E6
5.4E6
3.6E6
1.8E6
0.0E0
369.8919 F:2 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 478
33:10
A2.16E7
5.8E6
4.7E6
3.5E6
2.3E6
1.2E6
0.0E0
366.9792 F:2 Expt: OCDD
29:44
30:07
30:15
30:39
30:55
31:13
31:36
31:46
31:58
32:16
32:23
32:40
32:48
32:59
33:20
33:40
34:02
34:25
2.5E7
2.0E7
1.5E7
9.9E6
4.9E6
0.0E0
100%
80
60
40
20
0
30:00
31:00
32:00
33:00
34:00
Time

File: 010214P1 Acq: 14-FEB-2001 11:05:47 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 1 Text: DB5 CPSM / M23 CS3 Vial# 3 File Text: AAP DB5
389.8156 F:3 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 511

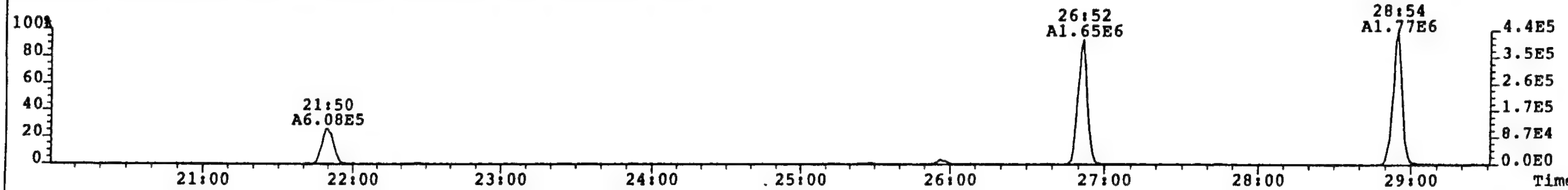


File: 010214P1 Acq: 14-FEB-2001 11:05:47 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 1 Text: DB5 CPSM / M23 CS3 Vial# 3 File Text: AAP DB5

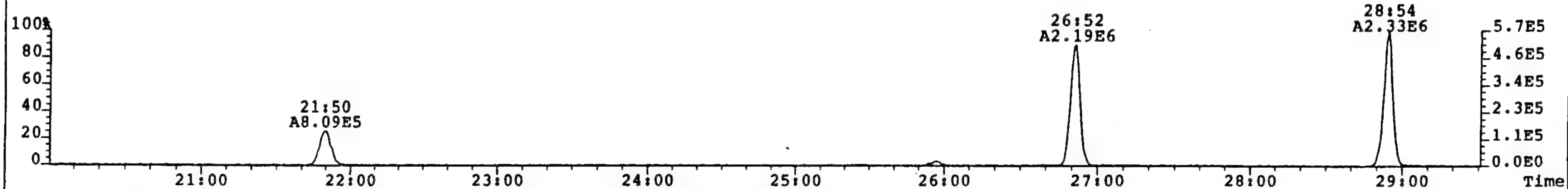



File: 010214P1 Acq: 14-FEB-2001 11:05:47 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 1 Text: DB5 CPSM / M23 CS3 Vial# 3 File Text: AAP DB5
457.7377 F:5 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 437
46:51
A9.00E6
459.7348 F:5 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 191
46:51
A1.02E7
469.7780 F:5 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 152
46:50
A1.73E7
471.7750 F:5 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 139
46:50
A1.93E7
454.9728 F:5 Expt: OCDD
44:46 45:01 45:18 45:30 45:55 46:14 46:30 46:41 46:55 47:17 47:37 47:57 48:05 48:23 48:42 48:56
45:00
46:00
47:00
48:00
49:00
Time

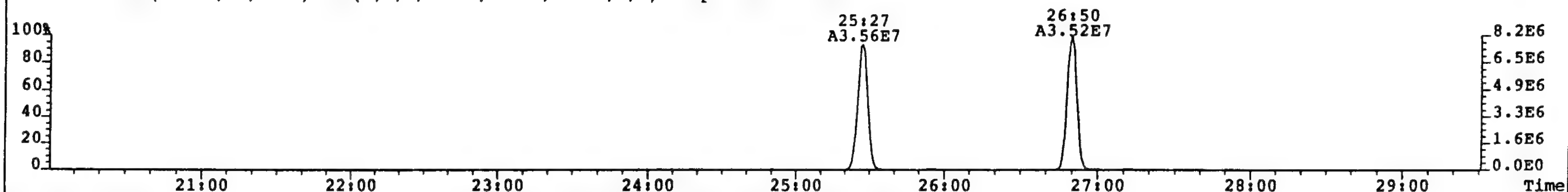
File: 010214P1 Acq: 14-FEB-2001 11:05:47 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 1 Text: DB5 CPSM / M23 CS3 Vial# 3 File Text: AAP DB5
303.9016 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 168



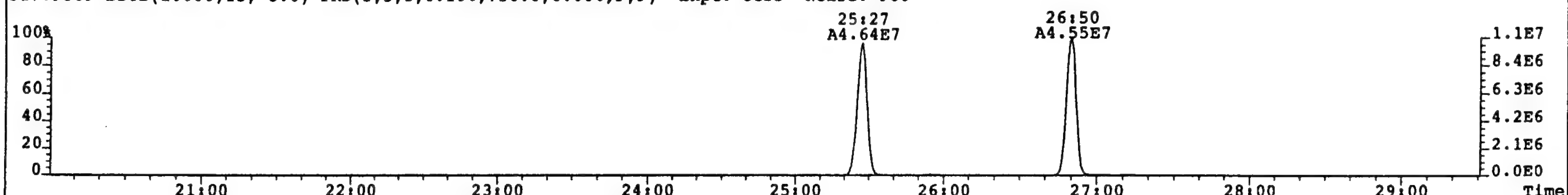
305.8987 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 362



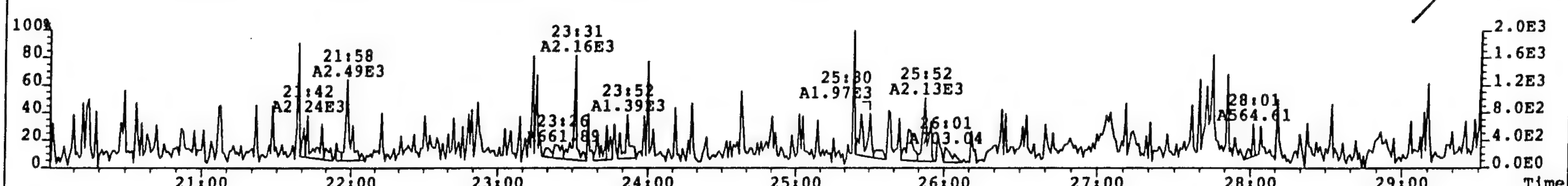
315.9419 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 369



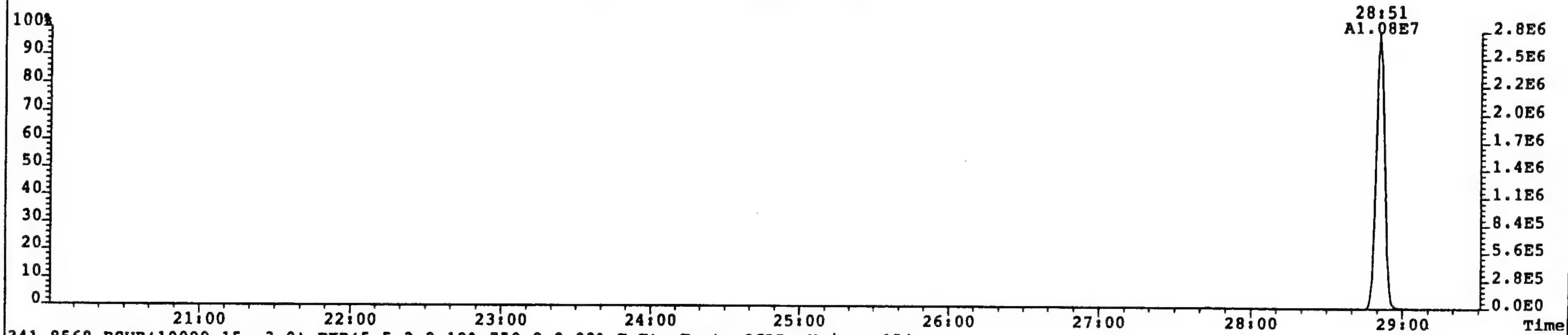
317.9389 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 966



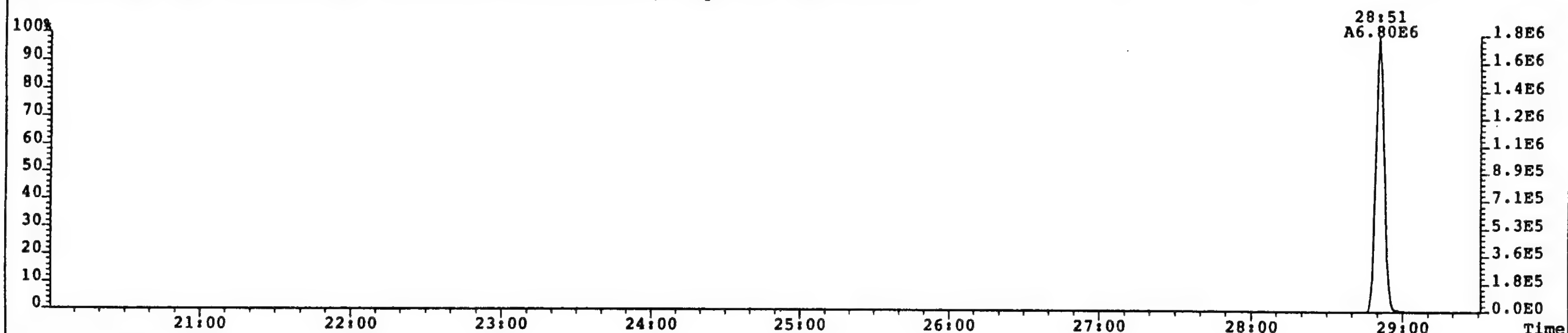
375.8364 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 71



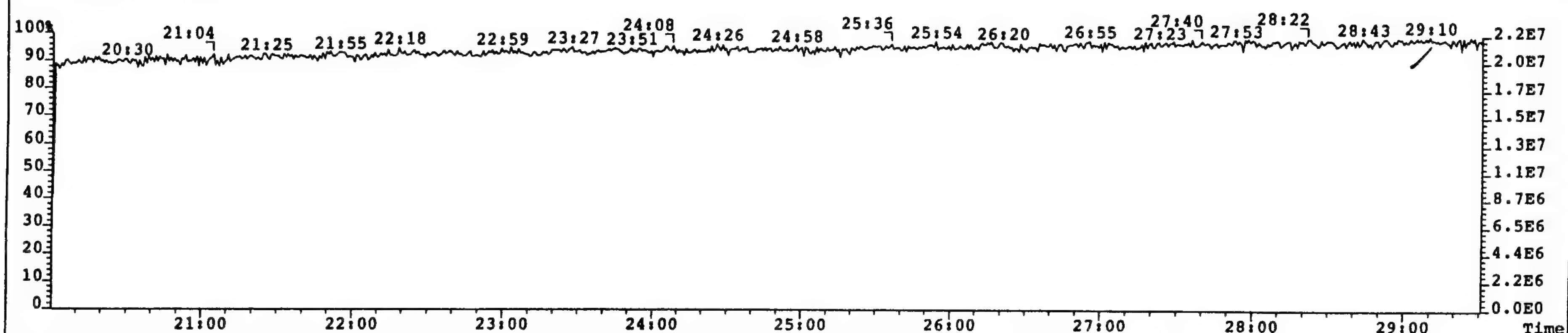
File: 010214P1 Acq: 14-FEB-2001 11:05:47 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 1 Text: DB5 CPSM / M23 CS3 Vial# 3 File Text: AAP DB5
339.8597 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 67

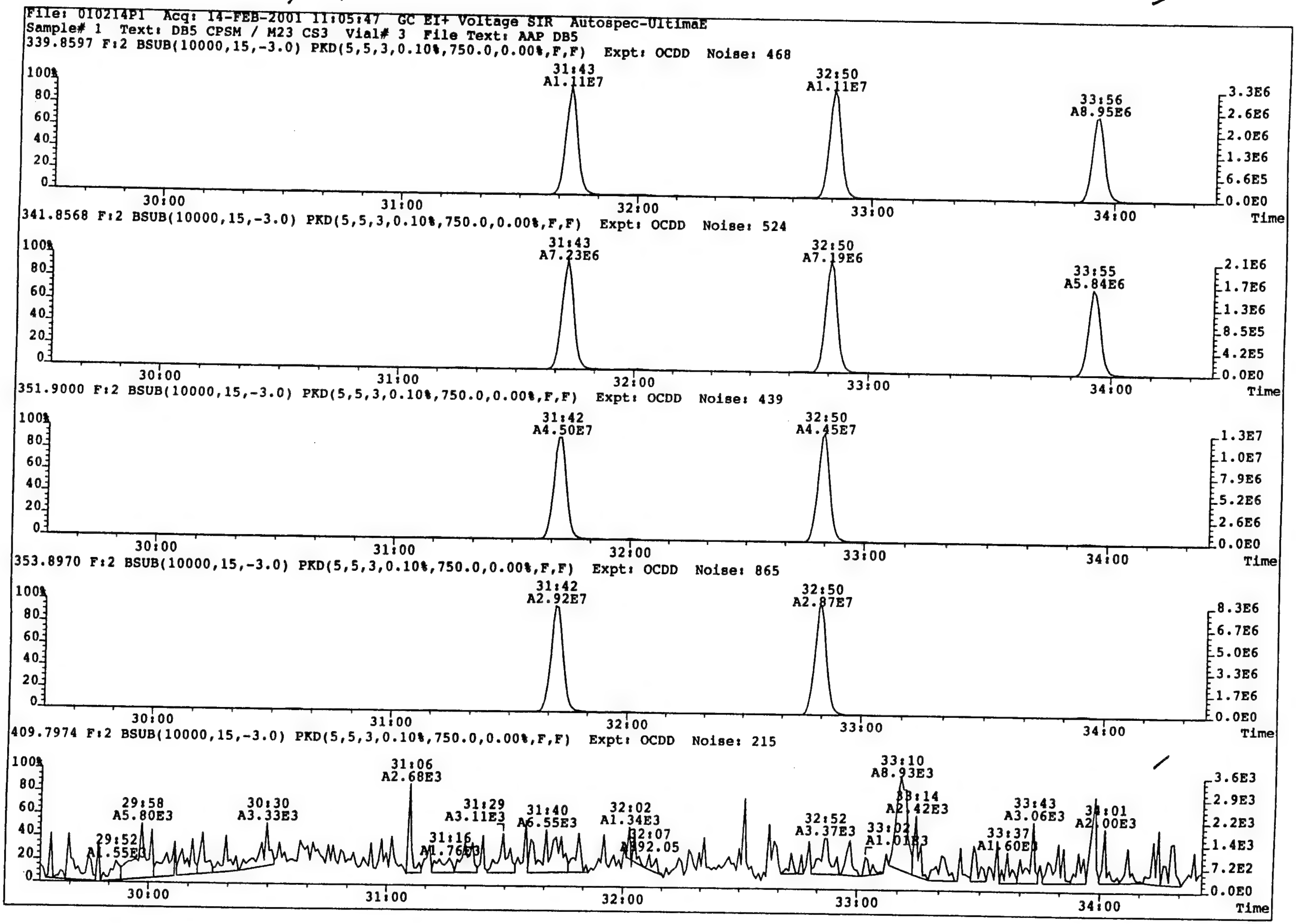


341.8568 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 154



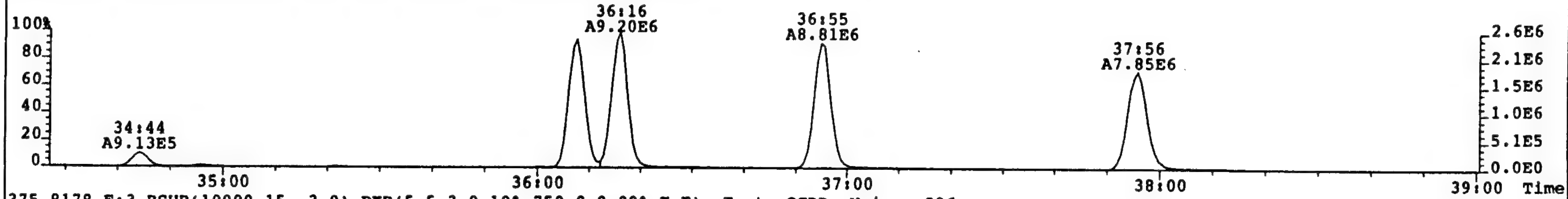
316.9824 Expt: OCDD



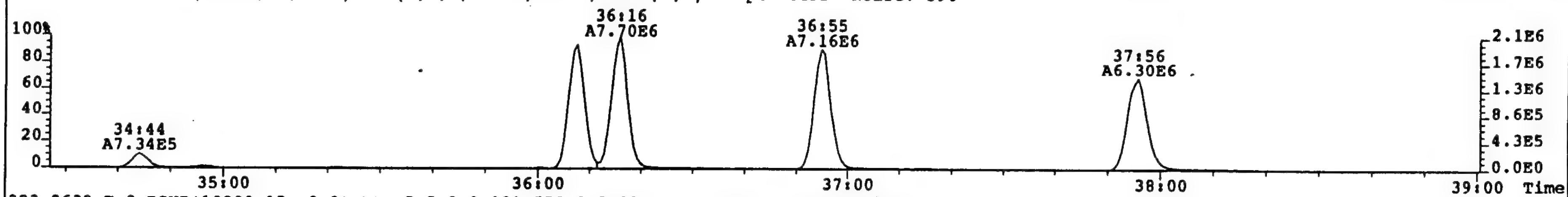

File: 010214P1 Acq: 14-FEB-2001 11:05:47 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 1 Text: DB5 CPSM / M23 CS3 Vial# 3 File Text: AAP DB5
339.8597 F:2 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 468
31:43 A1.11E7
32:50 A1.11E7
33:56 A8.95E6
341.8568 F:2 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 524
31:43 A7.23E6
32:50 A7.19E6
33:55 A5.84E6
351.9000 F:2 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 439
31:42 A4.50E7
32:50 A4.45E7
353.8970 F:2 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 865
31:42 A2.92E7
32:50 A2.87E7
409.7974 F:2 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 215
29:52 A1.55E3
29:58 A5.80E3
30:30 A3.33E3
31:06 A2.68E3
31:16 A1.76E3
31:29 A3.11E3
31:40 A6.55E3
32:02 A1.34E3
32:07 A992.05
32:52 A3.37E3
33:02 A1.01E3
33:10 A8.93E3
33:14 A2.42E3
33:37 A1.60E3
33:43 A3.06E3
34:01 A2.00E3
Time

File: 010214P1 Acq: 14-FEB-2001 11:05:47 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 1 Text: DB5 CPSM / M23 CS3 Vial# 3 File Text: AAP DB5

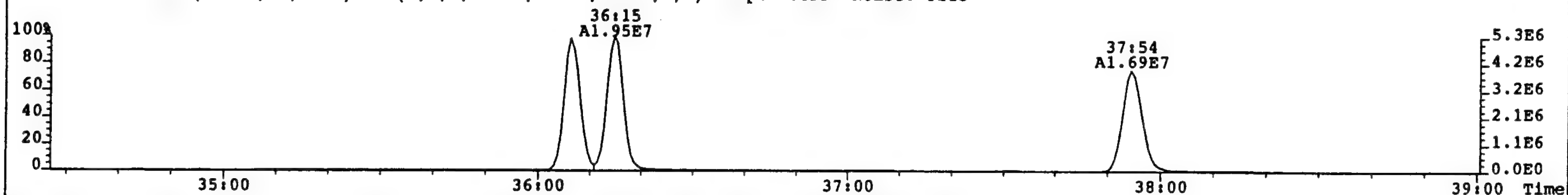
373.8207 F:3 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 569



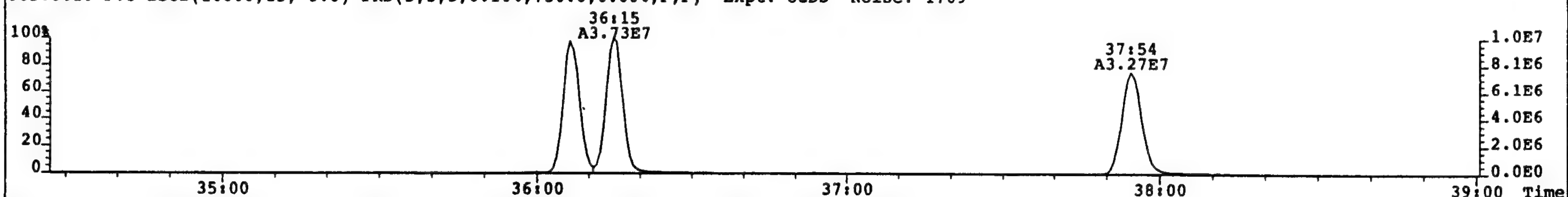
375.8178 F:3 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 396



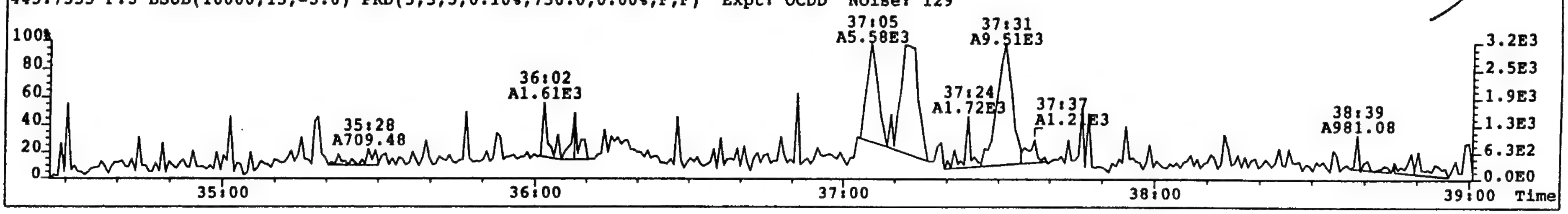
383.8639 F:3 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 3213

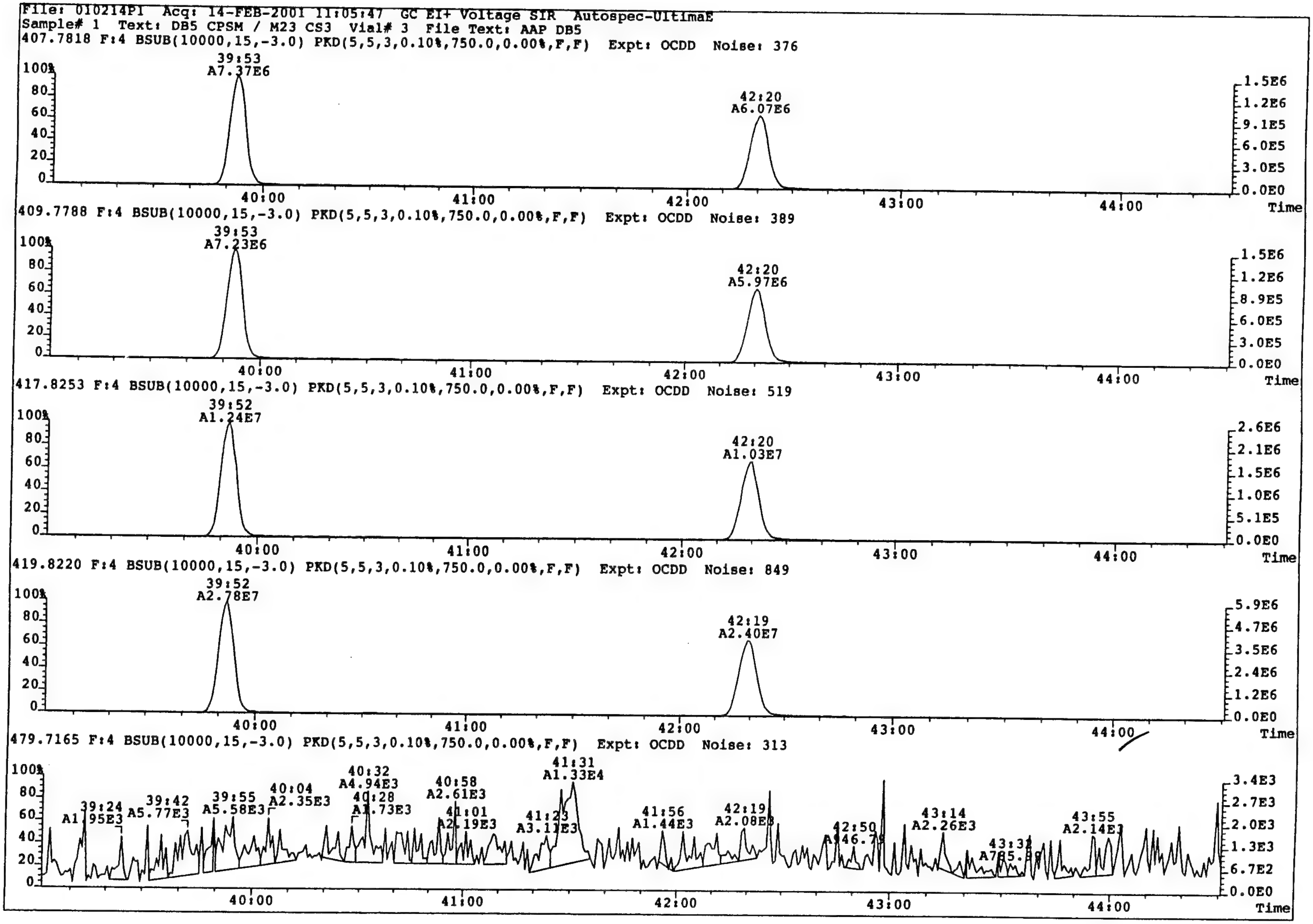


385.8610 F:3 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 1709

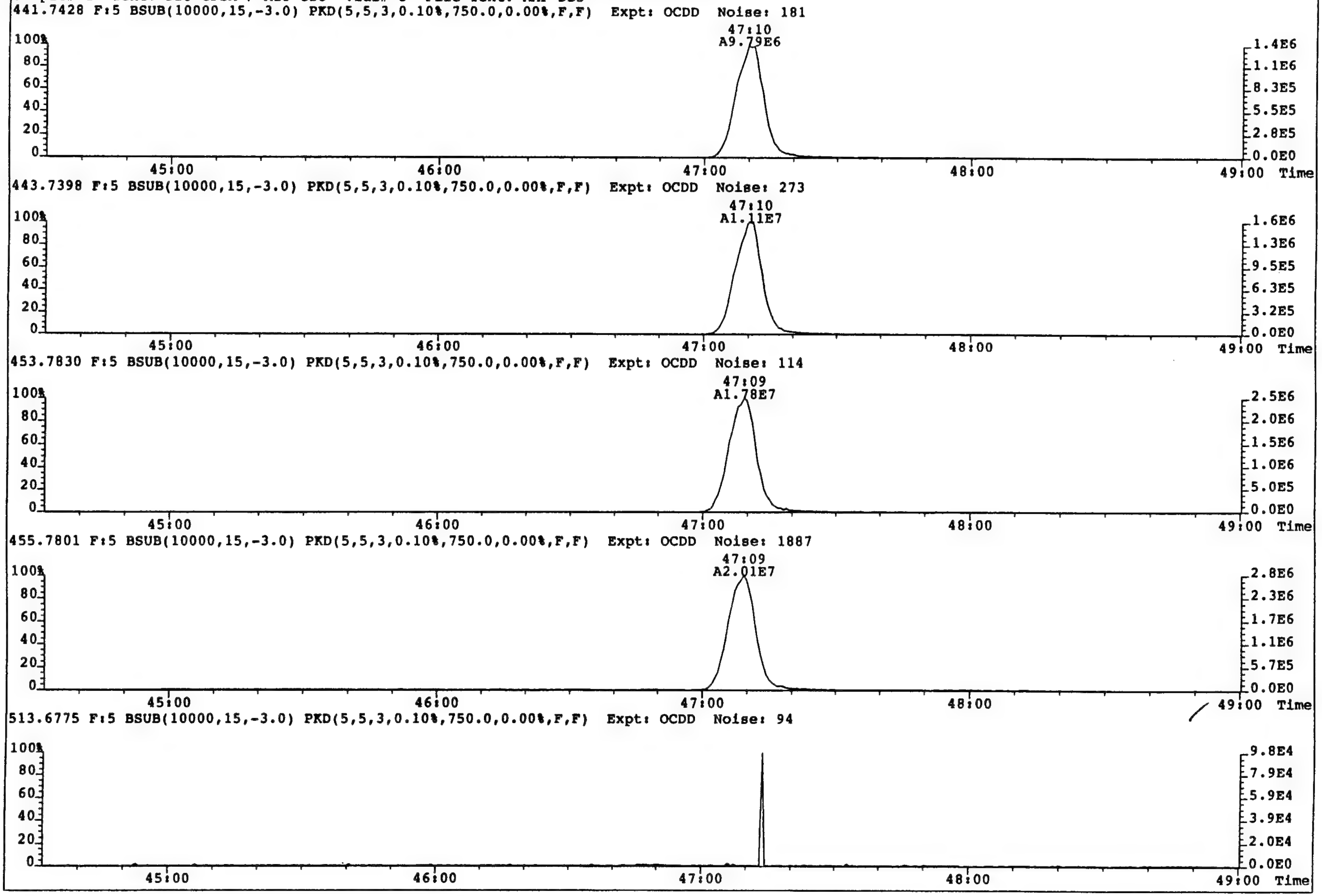


445.7555 F:3 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 129




File: 010214P1 Acq: 14-FEB-2001 11:05:47 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 1 Text: DB5 CPSM / M23 CS3 Vial# 3 File Text: AAP DB5
407.7818 F:4 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 376
39:53
A7.37E6
42:20
A6.07E6
409.7788 F:4 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 389
39:53
A7.23E6
42:20
A5.97E6
417.8253 F:4 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 519
39:52
A1.24E7
42:20
A1.03E7
419.8220 F:4 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 849
39:52
A2.78E7
42:19
A2.40E7
479.7165 F:4 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 313
39:24
39:42
A5.77E3
39:55
A5.58E3
40:04
A2.35E3
40:32
A4.94E3
40:58
A2.61E3
41:31
A1.33E4
41:23
41:56
A1.44E3
42:19
A2.08E3
42:50
43:14
A2.26E3
43:32
43:55
A2.14E3
40:00
41:00
42:00
43:00
44:00
Time

File: 010214P1 Acq: 14-FEB-2001 11:05:47 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 1 Text: DB5 CPSM / M23 CS3 Vial# 3 File Text: AAP DB5



PCDD/PCDF CALIBRATION VERIFICATION

Alta Analytical Perspectives

Reviewer: ce

Date: 24 Feb Ø1

Initial Calibration Date: 10/05/00

Instrument ID: MM-1 GC Column ID: DB-5

VER Data Filename: 010214P1 S#7 Analysis Date: 14-FEB-01 Time: 16:16:11

NATIVE ANALYTES	M/Z'S FORMING RATIO	ION ABUND. RATIO	QC LIMITS	Pass	CONC. FOUND	CONC. RANGE (ng/mL)
2,3,7,8-TCDD	M/M+2	0.78	0.65-0.89	y	5.20	3.75 - 6.25
1,2,3,7,8-PeCDD	M+2/M+4	1.52	1.32-1.78	y	26.07	18.75-31.25
1,2,3,4,7,8-HxCDD	M+2/M+4	1.25	1.05-1.43	y	25.54	18.75-31.25
1,2,3,6,7,8-HxCDD	M+2/M+4	1.27	1.05-1.43	y	25.48	18.75-31.25
1,2,3,7,8,9-HxCDD	M+2/M+4	1.21	1.05-1.43	y	25.82	18.75-31.25
1,2,3,4,6,7,8-HpCDD	M+2/M+4	1.03	0.88-1.20	y	24.53	18.75-31.25
OCDD	M+2/M+4	0.88	0.76-1.02	y	50.91	37 - 65
2,3,7,8-TCDF	M/M+2	0.76	0.65-0.89	y	4.50	3.75 - 6.25
1,2,3,7,8-PeCDF	M+2/M+4	1.53	1.32-1.78	y	23.69	18.75-31.25
2,3,4,7,8-PeCDF	M+2/M+4	1.52	1.32-1.78	y	23.63	18.75-31.25
1,2,3,4,7,8-HxCDF	M+2/M+4	1.22	1.05-1.43	y	24.61	18.75-31.25
1,2,3,6,7,8-HxCDF	M+2/M+4	1.22	1.05-1.43	y	24.34	18.75-31.25
2,3,4,6,7,8-HxCDF	M+2/M+4	1.21	1.05-1.43	y	24.75	18.75-31.25
1,2,3,7,8,9-HxCDF	M+2/M+4	1.22	1.05-1.43	y	24.73	18.75-31.25
1,2,3,4,6,7,8-HpCDF	M+2/M+4	1.02	0.88-1.20	y	23.58	18.75-31.25
1,2,3,4,7,8,9-HpCDF	M+2/M+4	1.01	0.88-1.20	y	23.65	18.75-31.25
OCDF	M+2/M+4	0.88	0.76-1.02	y	47.75	35 - 65

Analyst: GAG

Date: 20 Feb01

PCDD/PCDF CALIBRATION VERIFICATION

Alta Analytical Perspectives

Reviewer: Ce

Date: 24 Feb 01

Initial Calibration Date: 10/05/00

Instrument ID: MM-1 GC Column ID: DB-5

VER Data Filename: 010214P1 S#7 Analysis Date: 14-FEB-01 Time: 16:16:11

LABELED COMPOUNDS	M/Z'S FORMING RATIO	ION ABUND. RATIO	QC LIMITS	Pass	CONC. FOUND	CONC. RANGE (ng/mL)
13C-2,3,7,8-TCDD	M/M+2	0.79	0.65-0.89	y	95.8	70.0 - 130.0
13C-1,2,3,7,8-PeCDD	M+2/M+4	1.55	1.32-1.78	y	99.7	70.0 - 130.0
13C-1,2,3,6,7,8-HxCDD	M+2/M+4	1.26	1.05-1.43	y	91.9	70.0 - 130.0
13C-1,2,3,4,6,7,8-HpCDD	M+2/M+4	1.04	0.88-1.20	y	94.5	70.0 - 130.0
13C-OCDD	M+2/M+4	0.90	0.76-1.02	y	95.8	70.0 - 130.0
13C-2,3,7,8-TCDF	M/M+2	0.77	0.65-0.89	y	92.1	70.0 - 130.0
13C-1,2,3,7,8-PeCDF	M+2/M+4	1.55	1.32-1.78	y	92.4	70.0 - 130.0
13C-1,2,3,6,7,8-HxCDF	M/M+2	0.52	0.43-0.59	y	80.4	70.0 - 130.0
13C-1,2,3,4,6,7,8-HpCDF	M/M+2	0.44	0.37-0.51	y	82.3	70.0 - 130.0
13C-OCDF	M+2/M+4	0.89	0.76-1.02	y	89.4	70.0 - 130.0
37Cl-2,3,7,8-TCDD					102.4	75.0 - 125.0
13C-2,3,4,7,8-PeCDF	M+2/M+4	1.56	1.32-1.78	y	103.1	75.0 - 125.0
13C-1,2,3,4,7,8-HxCDD	M+2/M+4	1.25	1.05-1.43	y	105.1	75.0 - 125.0
13C-1,2,3,4,7,8-HxCDF	M/M+2	0.51	0.43-0.59	y	106.5	75.0 - 125.0
13C-1,2,3,4,7,8,9-HpCDF	M/M+2	0.44	0.37-0.51	y	105.2	75.0 - 125.0
13C-1,2,3,7,8,9-HxCDF	M/M+2	0.51	0.43-0.59	y	88.0	75.0 - 125.0

Analyst: GAG

Date: 20 Feb 01

Client ID: DB5 CPSM / M23 CS3 Filename: 010214P1 S: 7 Acq: 14-FEB-01 16:16:11 ConCal: 010214P1-
Lab ID: CS3RC GC Column ID: db-5 ICal: MM1_M23_0, wt/vol: 1.000 EndCal: 010214P1-

	Name	Resp	RA	RRF	RT	Conc	Qualif.	CDE	noise	Fac	DL	EMPC / Rec
	2,3,7,8-TCDD	4.10e+06	0.78 y	1.26	27:44	5.20			793	2.5	0.0176	
	1,2,3,7,8-PeCDD	1.40e+07	1.52 y	1.01	33:11	26.1			726	2.5	0.0319	
	1,2,3,4,7,8-HxCDD	1.24e+07	1.25 y	1.14	37:06	25.5			1945	2.5	0.0879	
	1,2,3,6,7,8-HxCDD	1.12e+07	1.27 y	1.02	37:13	25.5			1945	2.5	0.0979	
	1,2,3,7,8,9-HxCDD	1.26e+07	1.21 y	1.14	37:31	25.8			1945	2.5	0.0876	
	1,2,3,4,6,7,8-HpCDD	1.18e+07	1.03 y	1.13	41:30	24.5			2277	2.5	0.152	
	OCDD	1.83e+07	0.88 y	1.03	46:50	50.9			827	2.5	0.0913	
	2,3,7,8-TCDF	3.57e+06	0.76 y	1.05	26:51	4.50			1398	2.5	0.0329	
	1,2,3,7,8-PeCDF	1.69e+07	1.53 y	1.04	31:43	23.7			1286	2.5	0.0401	
	2,3,4,7,8-PeCDF	1.71e+07	1.52 y	1.05	32:50	23.6			1286	2.5	0.0395	
	1,2,3,4,7,8-HxCDF	1.43e+07	1.22 y	1.13	36:07	24.6			3321	2.5	0.0818	
	1,2,3,6,7,8-HxCDF	1.55e+07	1.22 y	1.24	36:15	24.3			3321	2.5	0.0748	
	2,3,4,6,7,8-HxCDF	1.48e+07	1.21 y	1.16	36:55	24.7			3321	2.5	0.0795	
	1,2,3,7,8,9-HxCDF	1.29e+07	1.22 y	1.02	37:55	24.7			3321	2.5	0.0909	
	1,2,3,4,6,7,8-HpCDF	1.35e+07	1.02 y	1.54	39:52	23.6			3009	2.5	0.0948	
	1,2,3,4,7,8,9-HpCDF	1.14e+07	1.01 y	1.30	42:20	23.6			3009	2.5	0.113	
	OCDF	1.98e+07	0.88 y	1.15	47:09	47.8			1658	2.5	0.144	
												EMPC
	Total Tetra-Dioxins	1.64e+07	0.77 y	1.26	23:60	20.8			793	2.5	0.0176	20.9
	Total Penta-Dioxins	3.71e+07	1.54 y	1.01	30:39	69.0			726	2.5	0.0319	69.2
	Total Hexa-Dioxins	3.75e+07	1.31 y	1.10	35:23	79.6			1945	2.5	0.0909	80.1
	Total Hepta-Dioxins	2.18e+07	1.01 y	1.13	40:19	45.3			2277	2.5	0.152	45.7
	Total Tetra-Furans	9.06e+06	0.77 y	1.05	21:50	11.4			1398	2.5	0.0329	11.6
	1st Fnc. Penta-Furans	1.66e+07	1.58 y	1.05	28:51	23.1			2814	2.5	0.0872	23.2
	Total Penta-Furans	4.81e+07	1.53 y	1.05	31:43	66.9			1286	2.5	0.0398	
	PeCDF Totals:					90.0						90.3
	Total Hexa-Furans	5.94e+07	1.22 y	1.14	34:44	102			3321	2.5	0.0813	102
	Total Hepta-Furans	2.49e+07	1.02 y	1.42	39:52	47.3			3009	2.5	0.103	47.6
												Rec
IS	13C-2,3,7,8-TCDD	6.26e+07	0.79 y	1.13	27:43	95.8						95.8
IS	13C-1,2,3,7,8-PeCDD	5.32e+07	1.55 y	0.93	33:10	99.7						99.7
IS	13C-1,2,3,6,7,8-HxCDD	4.28e+07	1.26 y	0.93	37:12	91.9						91.9
IS	13C-1,2,3,4,6,7,8-HpCDD	4.27e+07	1.04 y	0.91	41:29	94.5						94.5
IS	13C-OCDD	3.50e+07	0.90 y	0.73	46:49	95.8						95.8
IS	13C-2,3,7,8-TCDF	7.58e+07	0.77 y	1.06	26:49	92.1						92.1
IS	13C-1,2,3,7,8-PeCDF	6.88e+07	1.55 y	0.96	31:42	92.4						92.4
IS	13C-1,2,3,6,7,8-HxCDF	5.14e+07	0.52 y	1.28	36:14	80.4						80.4
IS	13C-1,2,3,4,6,7,8-HpCDF	3.70e+07	0.44 y	0.90	39:51	82.3						82.3
IS	13C-OCDF	3.62e+07	0.89 y	0.81	47:08	89.4						89.4
RS/RT	13C-1,2,3,4-TCDD	5.76e+07	0.80 y	1.00	27:03	100						-
RS	13C-1,2,3,4-TCDF	7.76e+07	0.76 y	1.00	25:26	100						-
RS/RT	13C-1,2,3,7,8,9-HxCDD	4.99e+07	1.24 y	1.00	37:30	100						-
PS	37Cl-2,3,7,8-TCDD	3.30e+07		0.51	27:44	102						102
PS	13C-2,3,4,7,8-PeCDF	6.90e+07	1.56 y	0.97	32:49	103						103
PS	13C-1,2,3,4,7,8-HxCDD	4.15e+07	1.25 y	0.92	37:05	105						105
PS	13C-1,2,3,4,7,8-HxCDF	4.98e+07	0.51 y	0.91	36:06	106						106
PS	13C-1,2,3,4,7,8,9-HpCDF	3.33e+07	0.44 y	0.85	42:19	105						105
AS	13C-1,2,3,7,8,9-HxCDF	4.69e+07	0.51 y	1.07	37:54	88.0						88.0

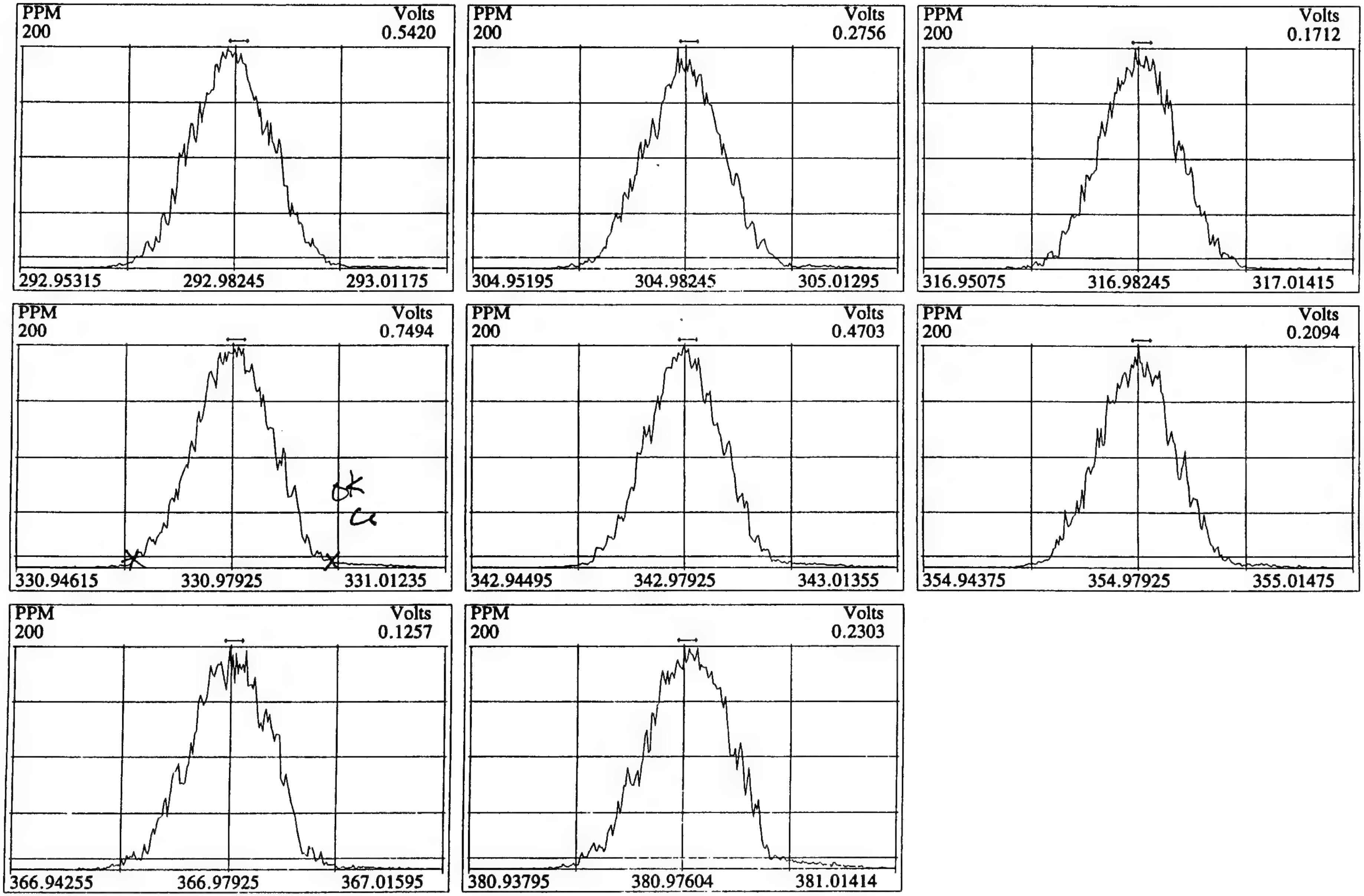
Reviewer: CL

Date: 24 Feb 01

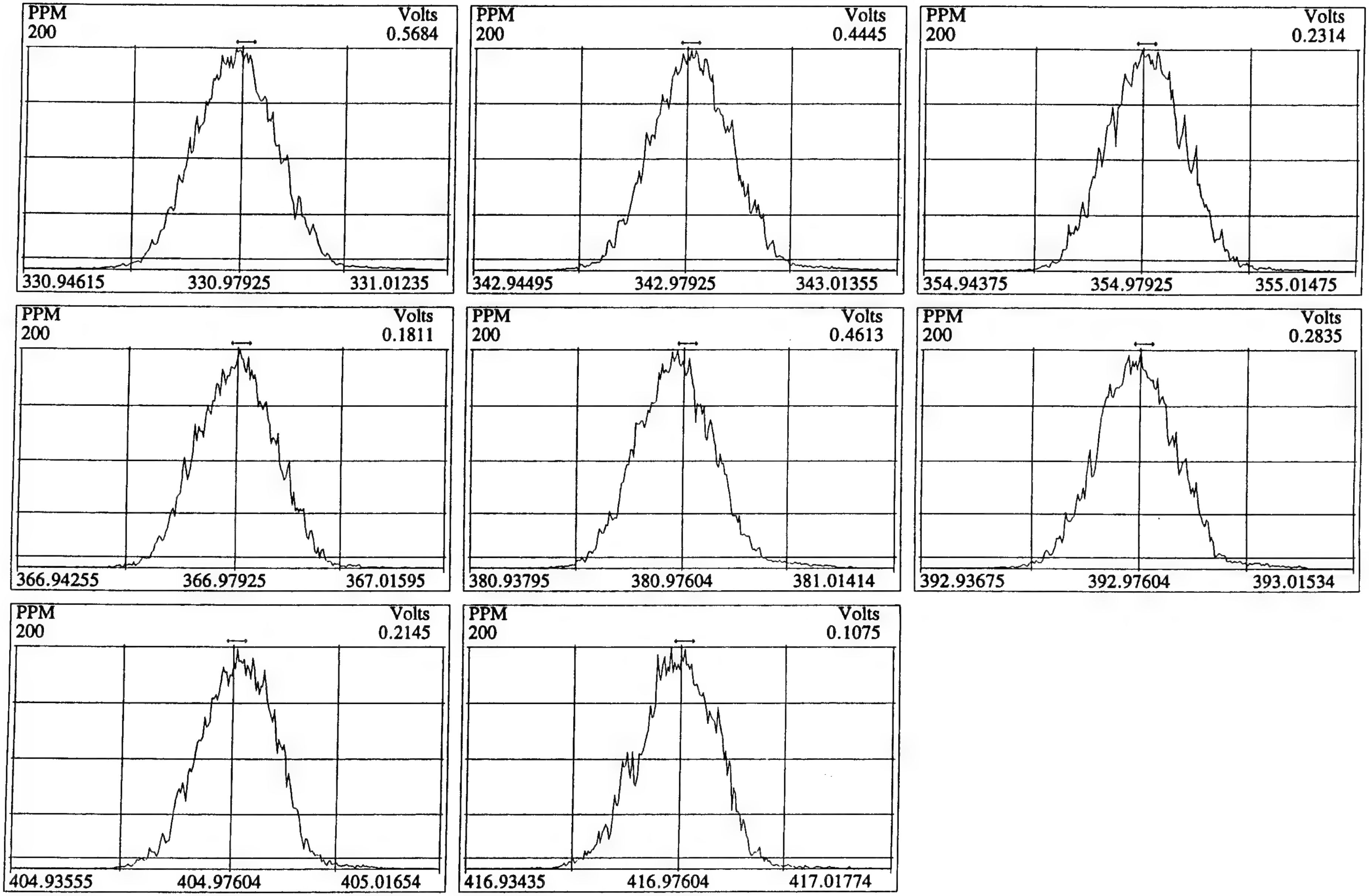
Analyst: GAG

Date: 20Feb01

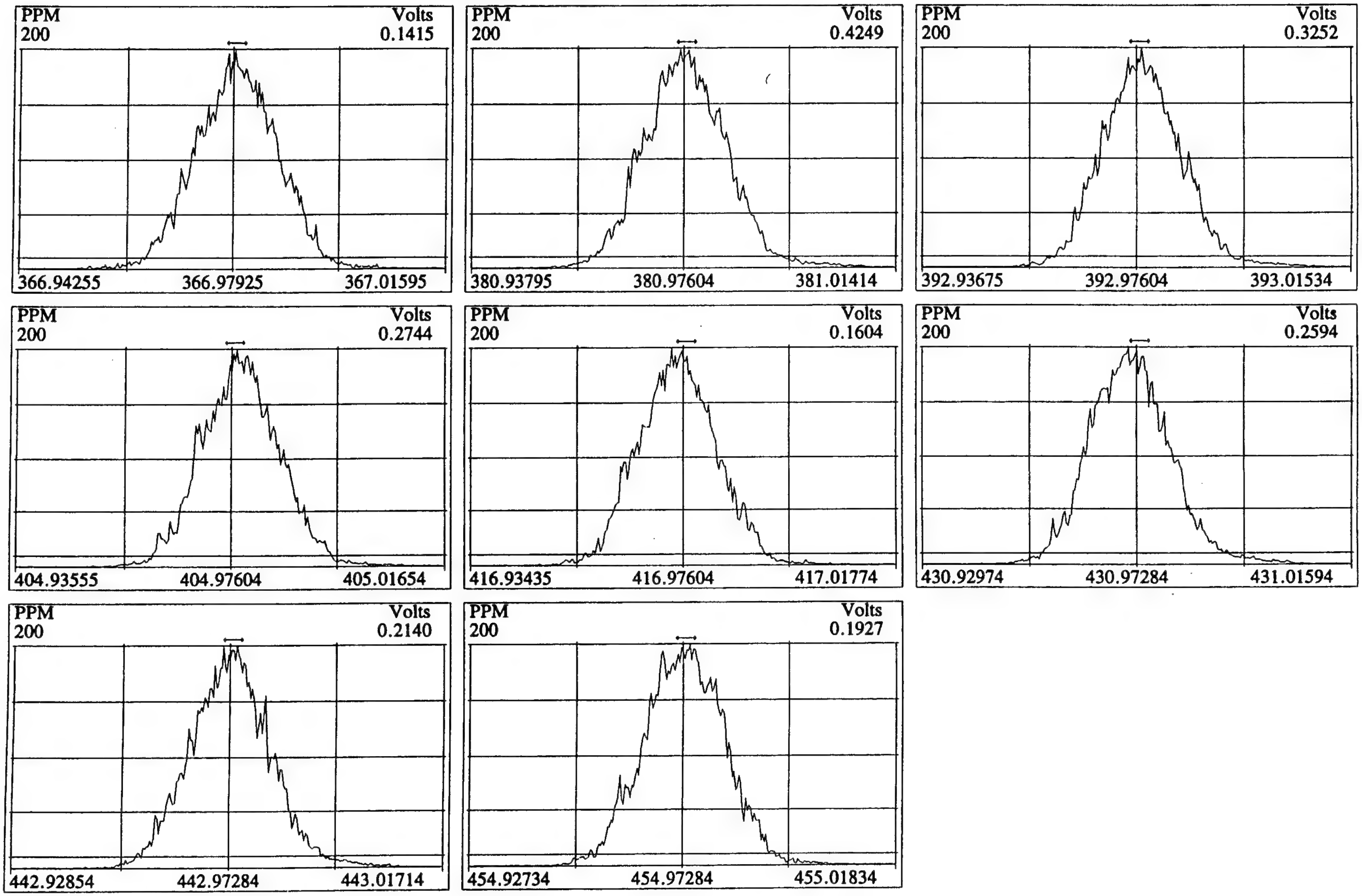
Peak Locate Examination:14-FEB-2001:17:12 File:RES_CHECK
Experiment:OCDD Function:1 Reference:PFK2



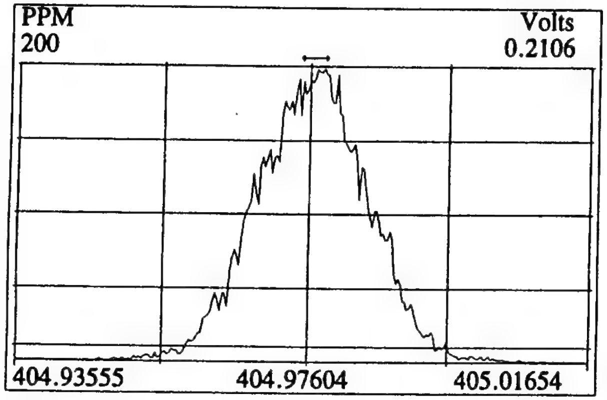
Peak Locate Examination:14-FEB-2001:17:13 File:RES_CHECK
Experiment:OCDD Function:2 Reference:PFK2

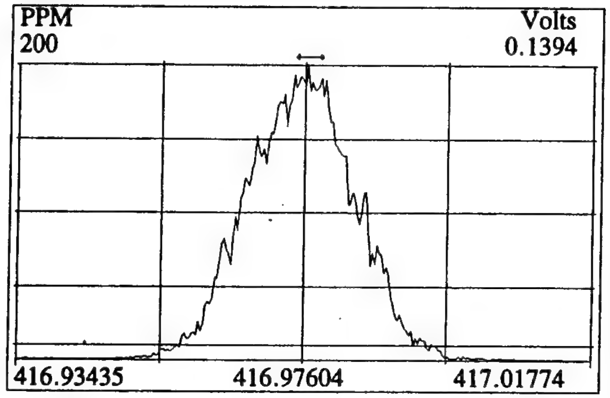


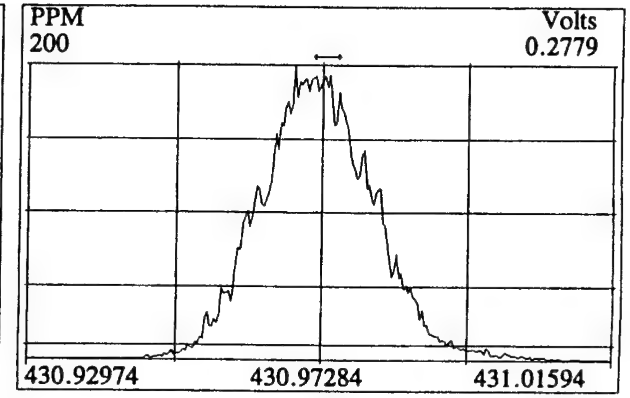
Peak Locate Examination:14-FEB-2001:17:14 File:RES_CHECK
Experiment:OCDD Function:3 Reference:PFK2

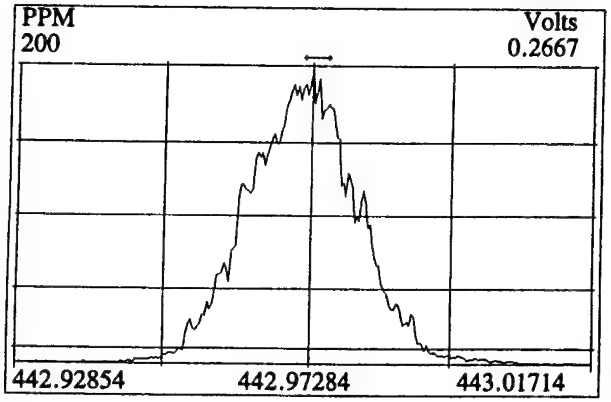


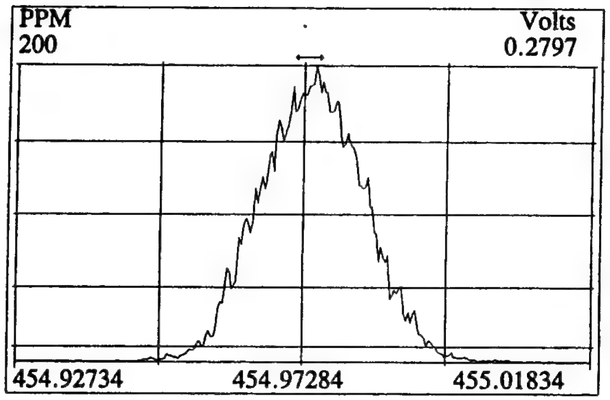
Peak Locate Examination:14-FEB-2001:17:15 File:RES_CHECK
Experiment:OCDD Function:4 Reference:PFK2

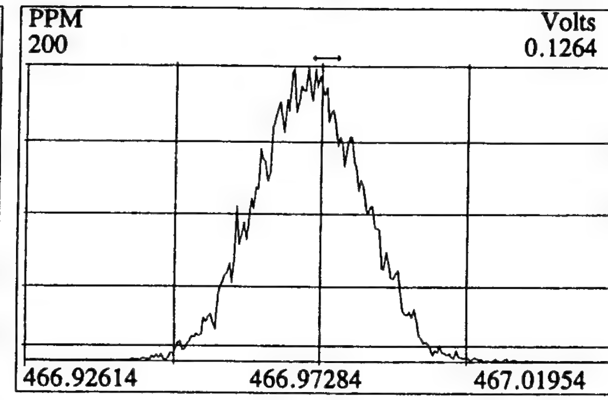


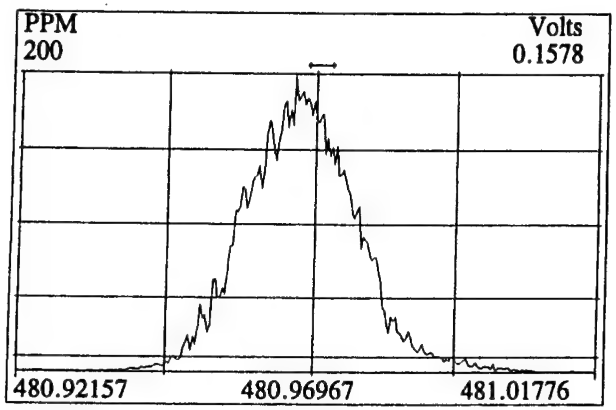






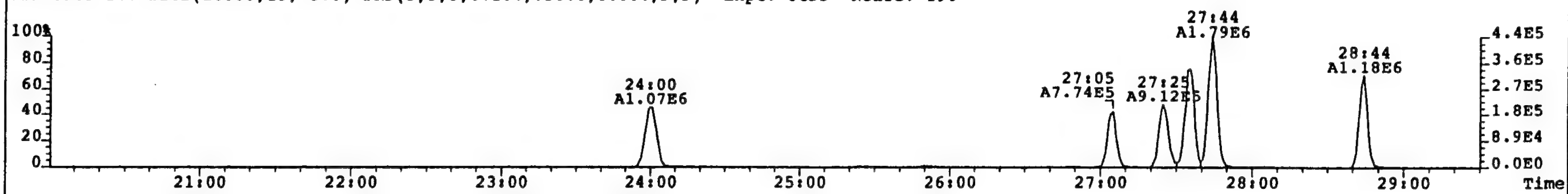




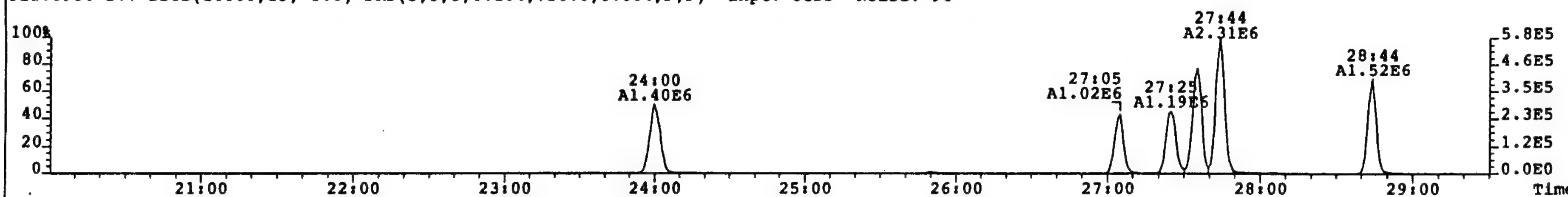


File: 010214P1 Acq: 14-FEB-2001 16:16:11 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 7 Text: DB5 CPSM / M23 CS3 Vial# 3 File Text: AAP DB5

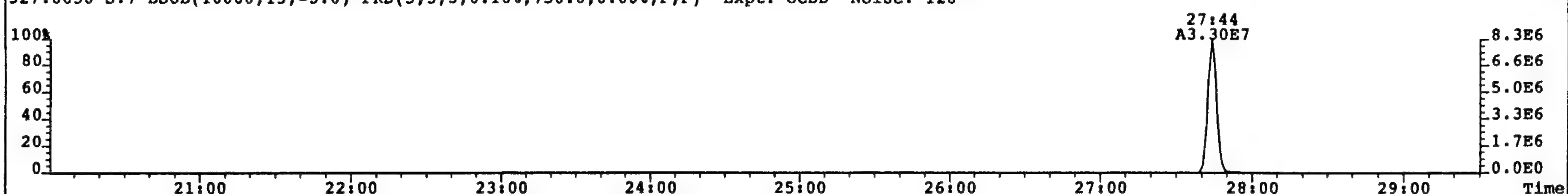
319.8965 S:7 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 190



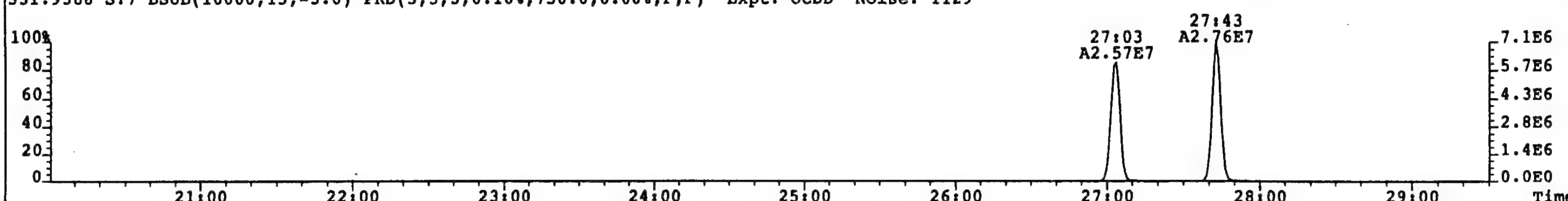
321.8936 S:7 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 96



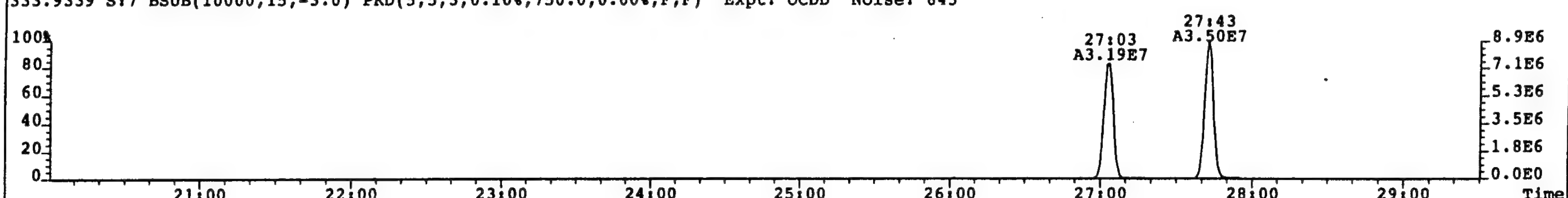
327.8850 S:7 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 128



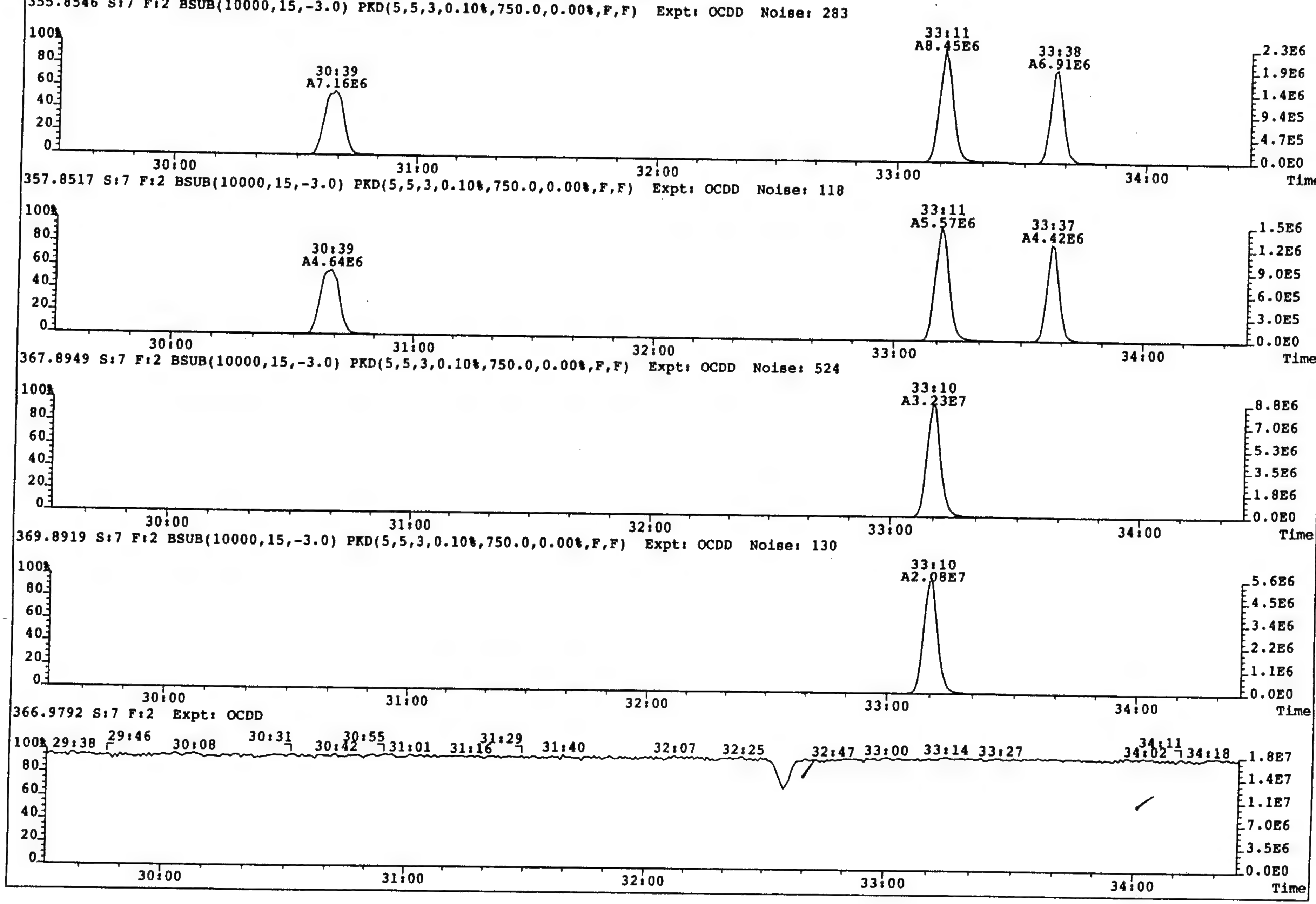
331.9368 S:7 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 1129



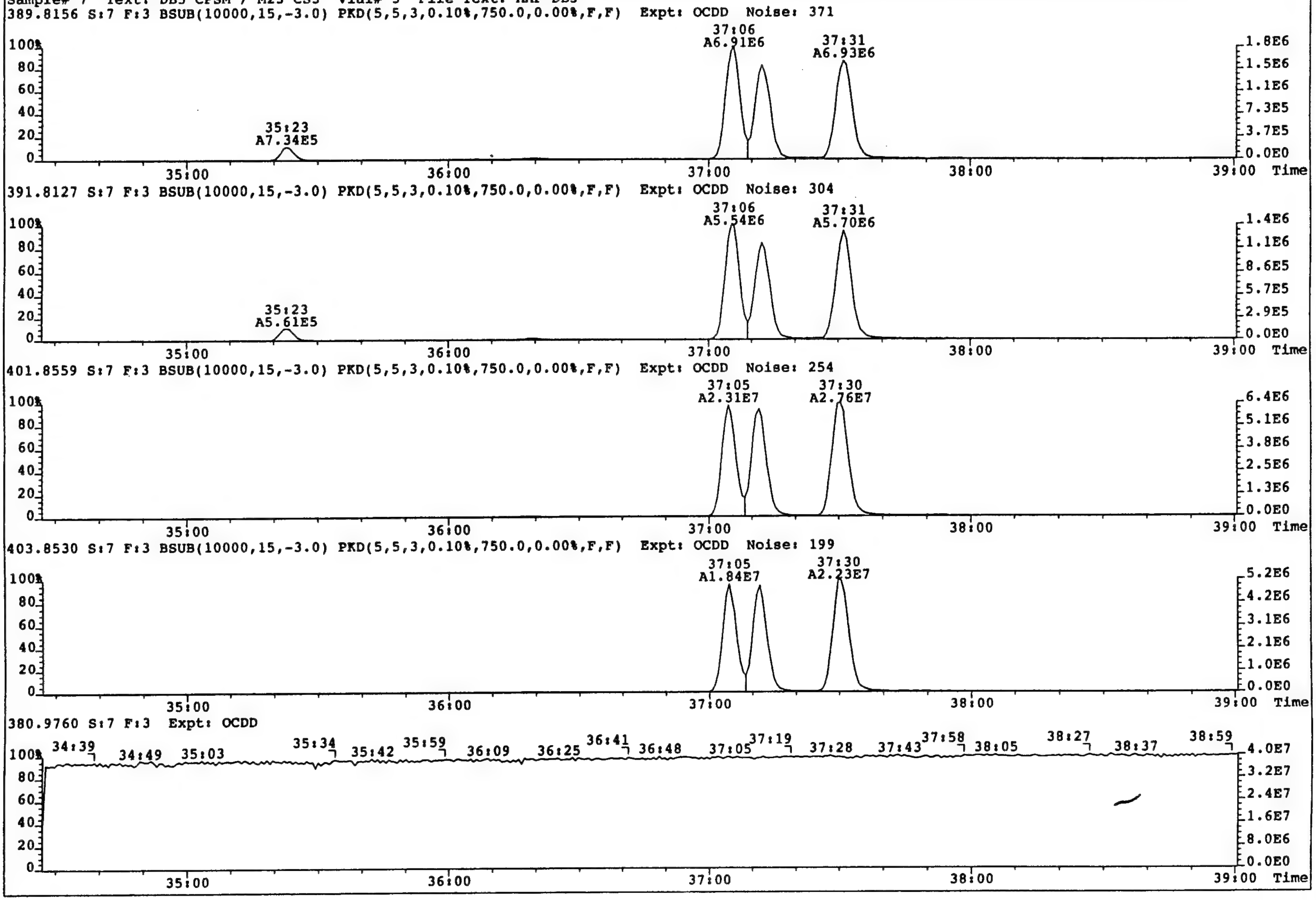
333.9339 S:7 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 645



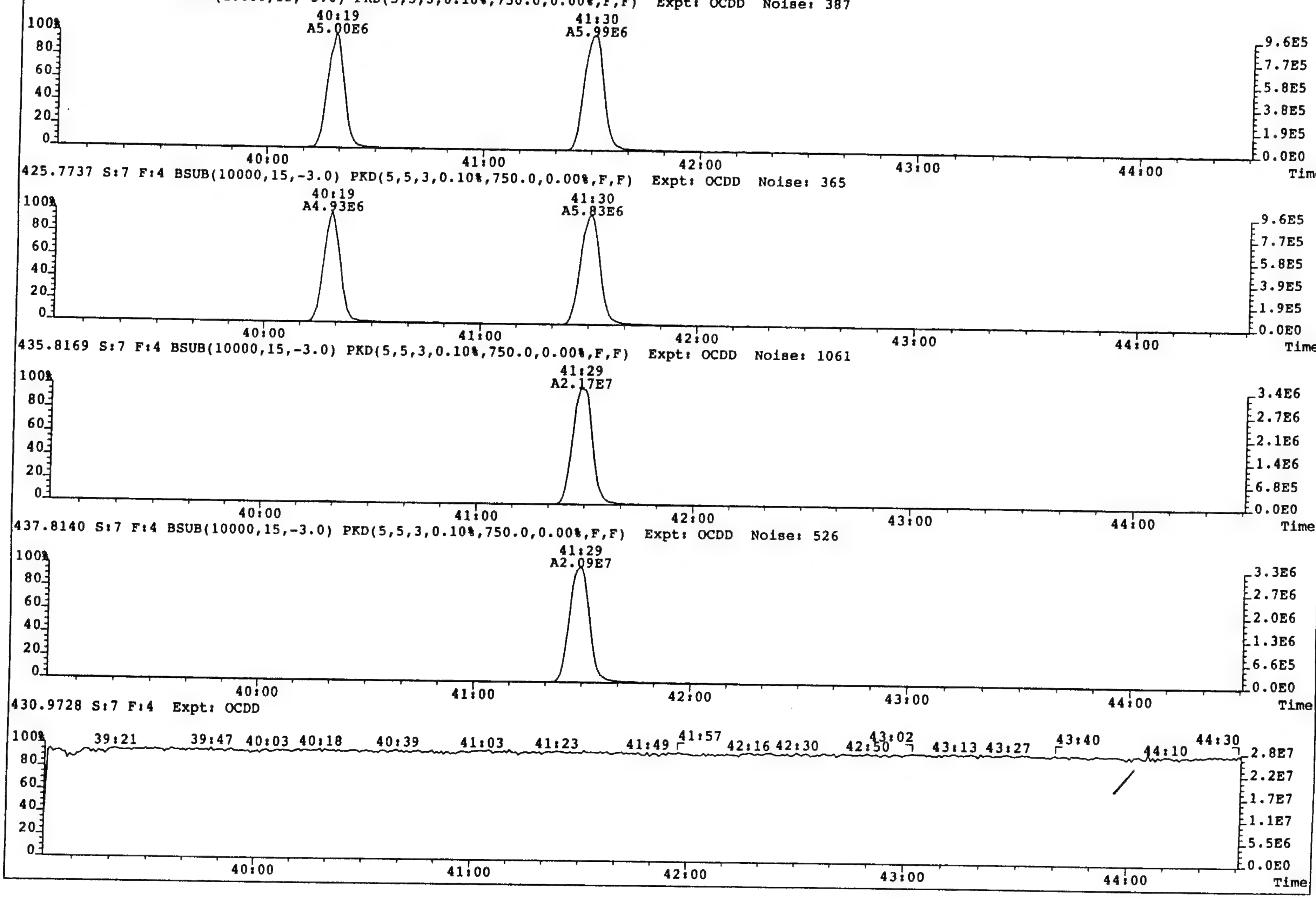
File: 010214P1 Acq: 14-FEB-2001 16:16:11 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 7 Text: DB5 CPSM / M23 CS3 Vial# 3 File Text: AAP DB5

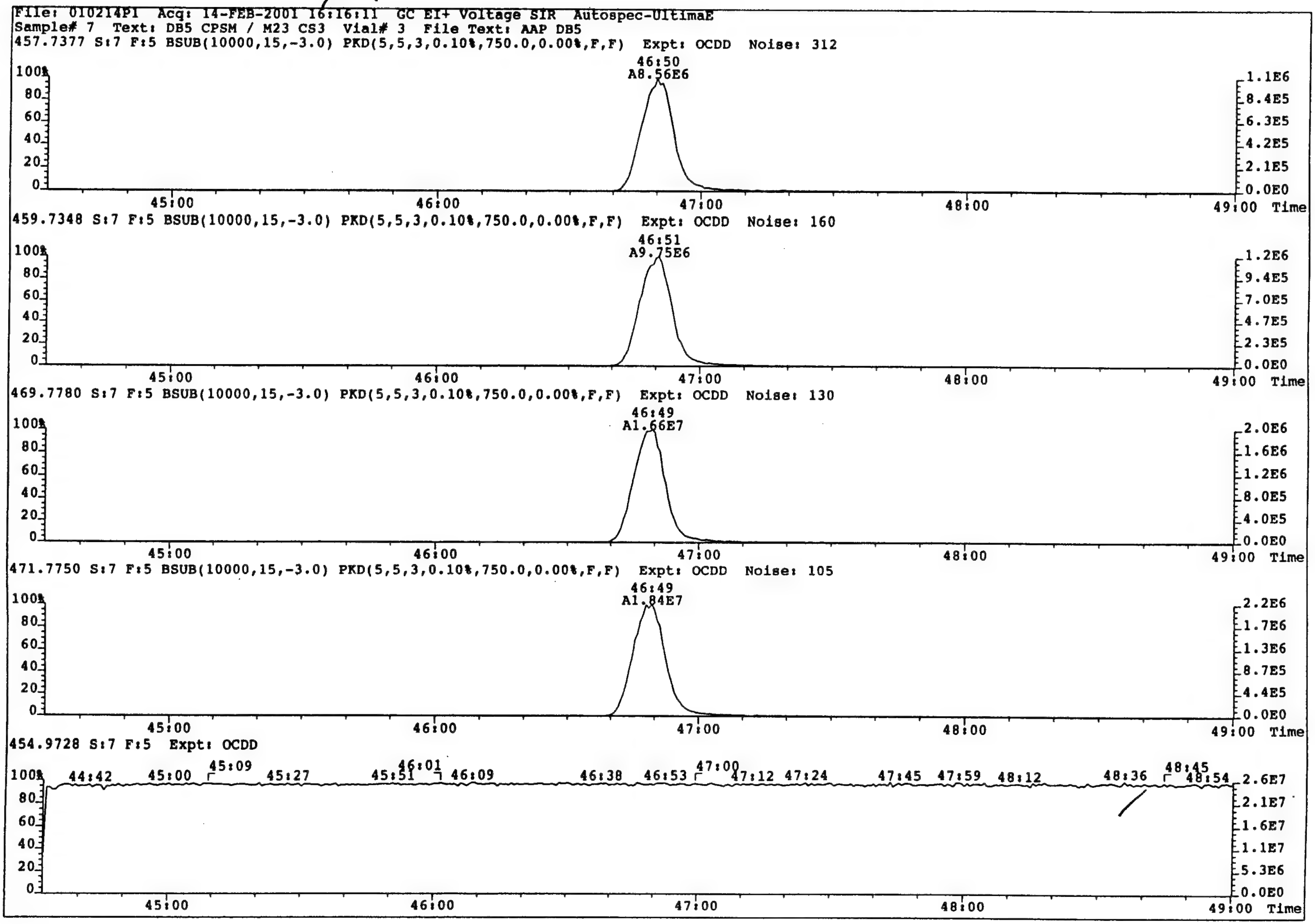


File: 010214P1 Acq: 14-FEB-2001 16:16:11 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 7 Text: DB5 CPSM / M23 CS3 Vial# 3 File Text: AAP DB5

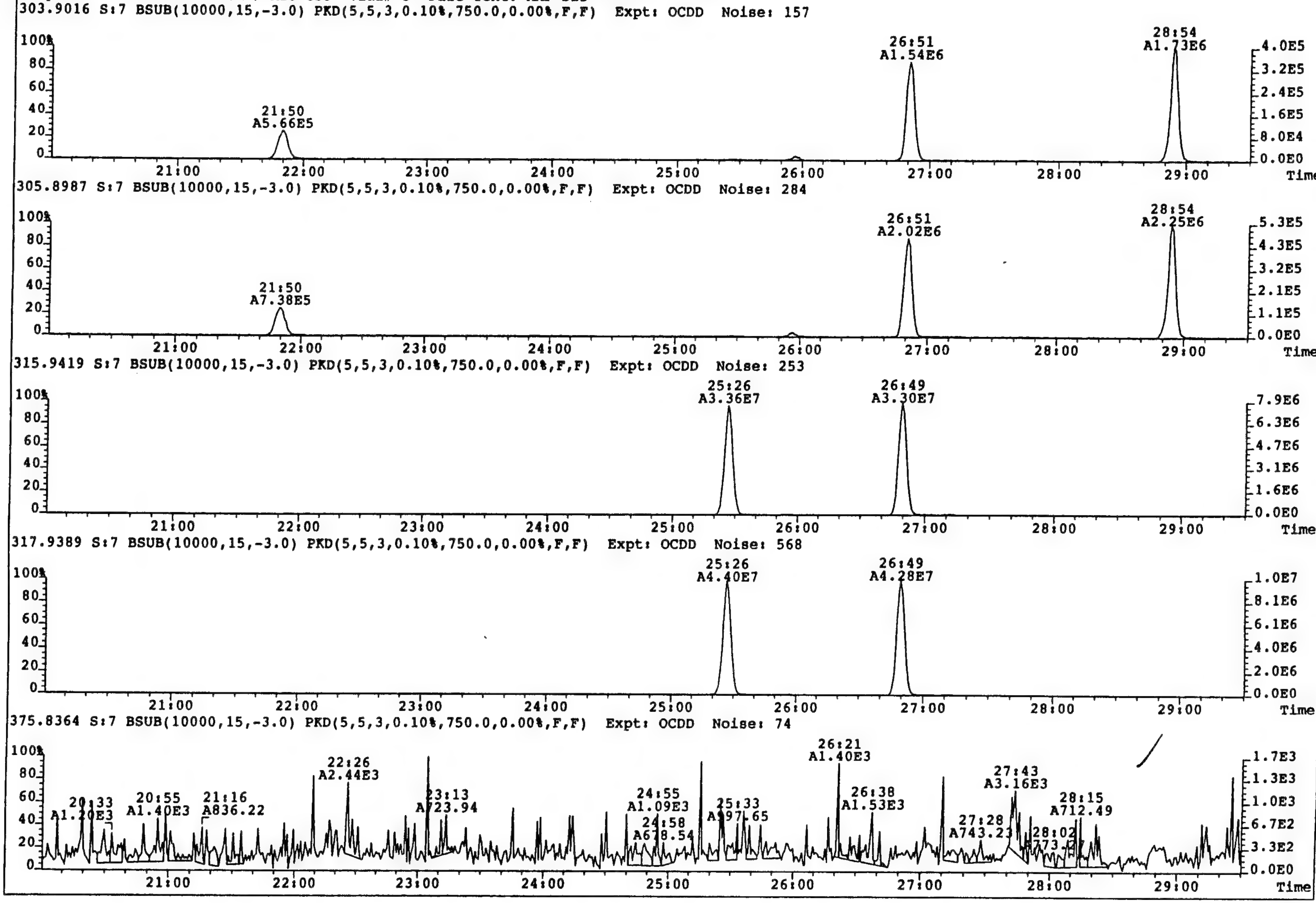


File: 010214P1 Acq: 14-FEB-2001 16:16:11 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 7 Text: DB5 CPSM / M23 CS3 Vial# 3 File Text: AAP DB5
423.7767 S:7 F:4 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 387

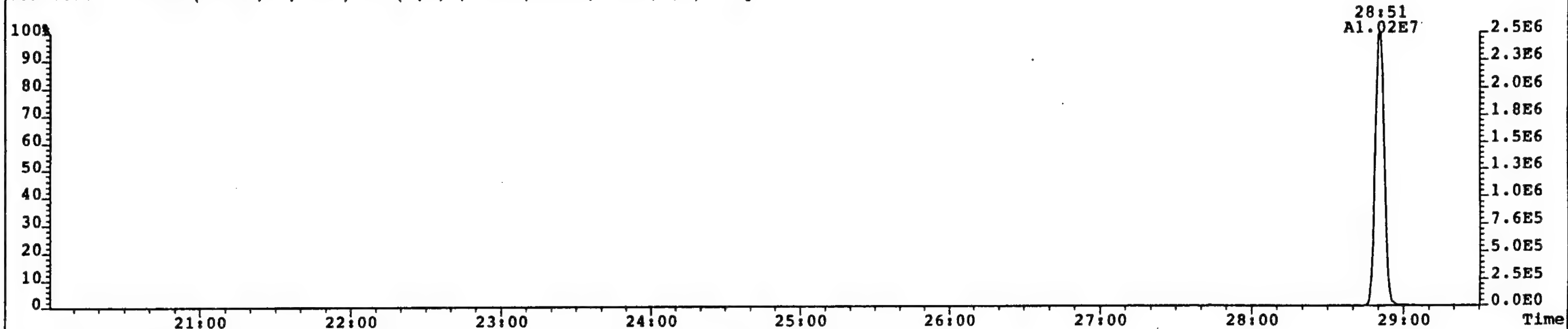



File: 010214P1 Acq: 14-FEB-2001 16:16:11 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 7 Text: DB5 CPSM / M23 CS3 Vial# 3 File Text: AAP DB5
457.7377 S:7 F:5 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 312
46:50
A8.56E6
459.7348 S:7 F:5 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 160
46:51
A9.75E6
469.7780 S:7 F:5 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 130
46:49
A1.66E7
471.7750 S:7 F:5 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 105
46:49
A1.84E7
454.9728 S:7 F:5 Expt: OCDD
44:42 45:00 45:09 45:27 45:51 46:01 46:09 46:38 46:53 47:00 47:12 47:24 47:45 47:59 48:12 48:36 48:45 48:54
45:00
46:00
47:00
48:00
49:00 Time

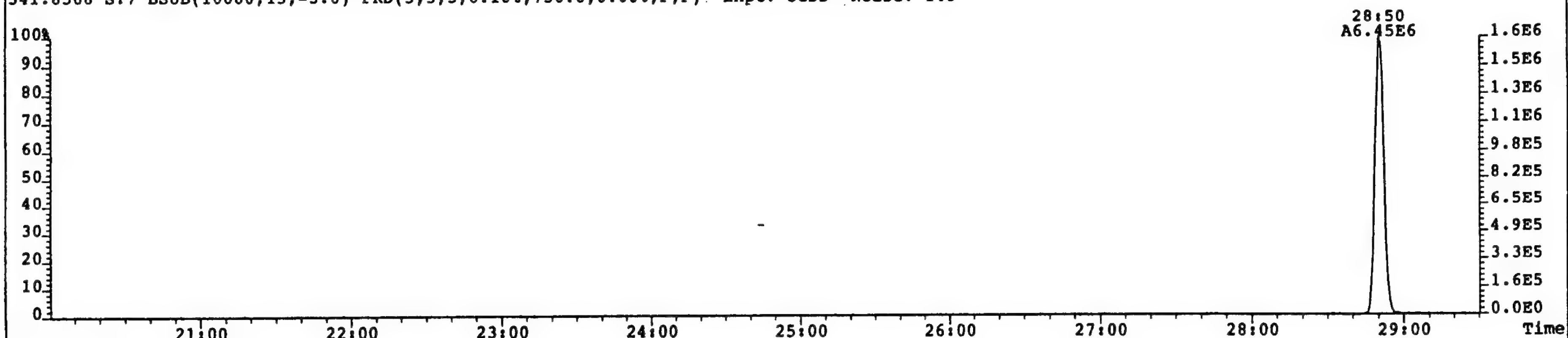
File: 010214P1 Acq: 14-FEB-2001 16:16:11 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 7 Text: DB5 CPSM / M23 CS3 Vial# 3 File Text: AAP DB5



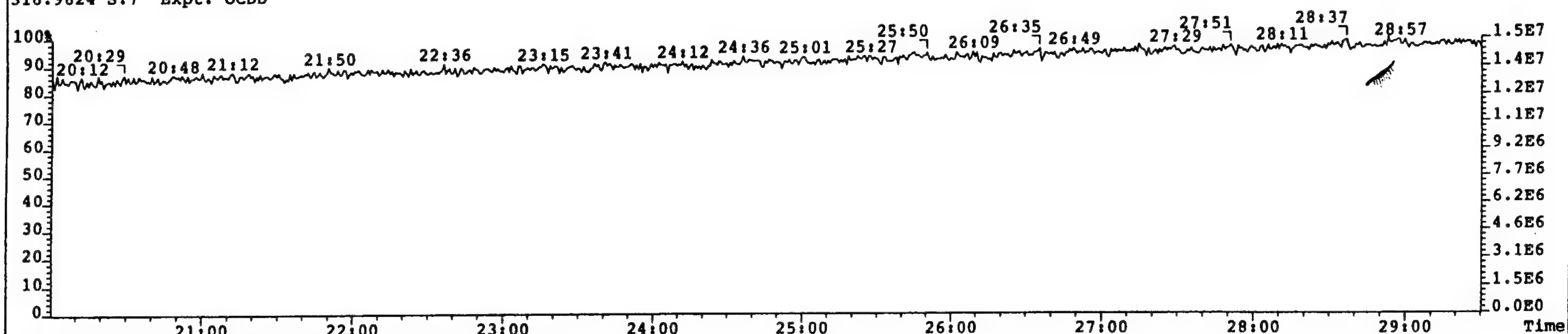
File: 010214P1 Acq: 14-FEB-2001 16:16:11 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 7 Text: DB5 CPSM / M23 CS3 Vial# 3 File Text: AAP DB5
339.8597 S:7 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 71



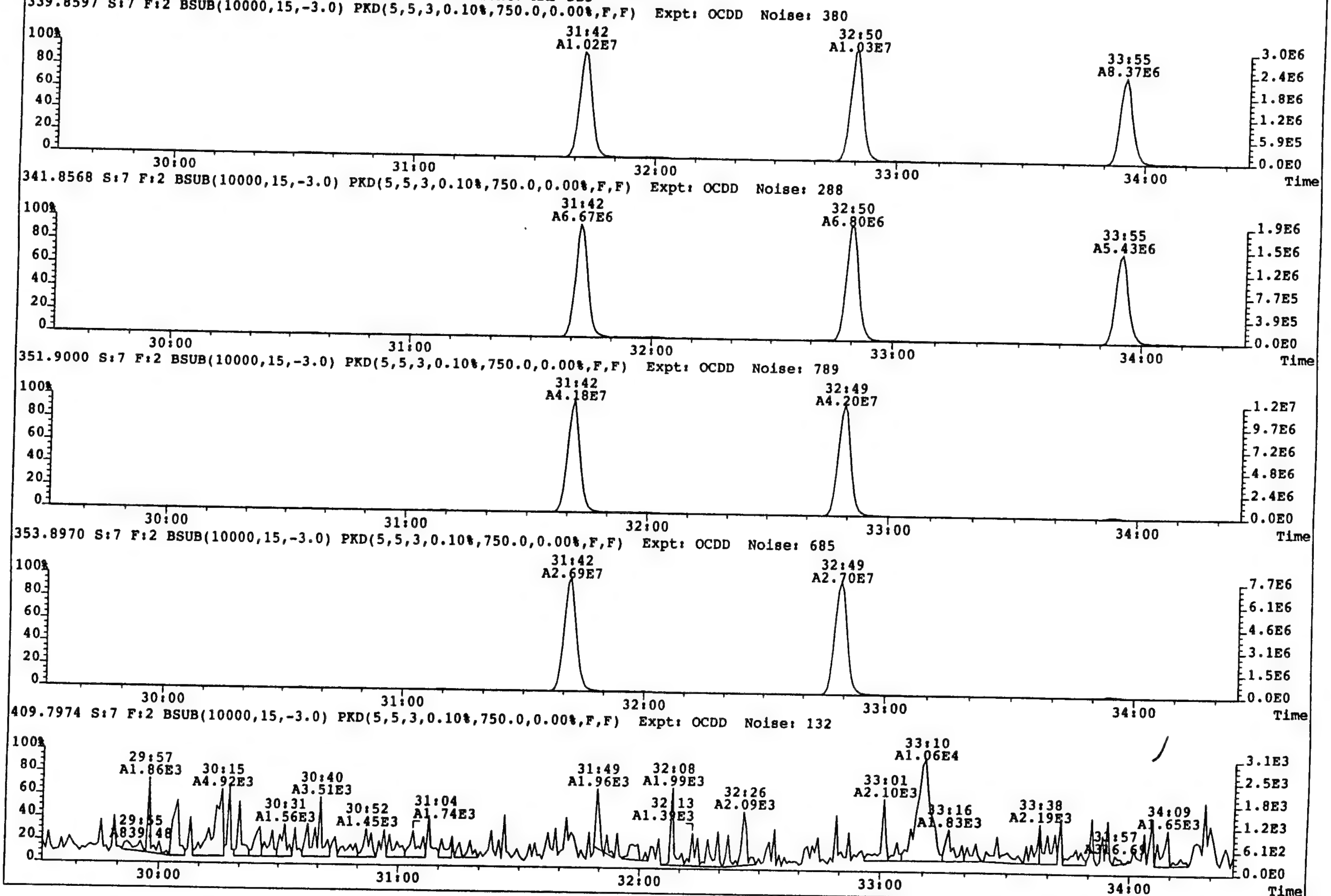
341.8568 S:7 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 148



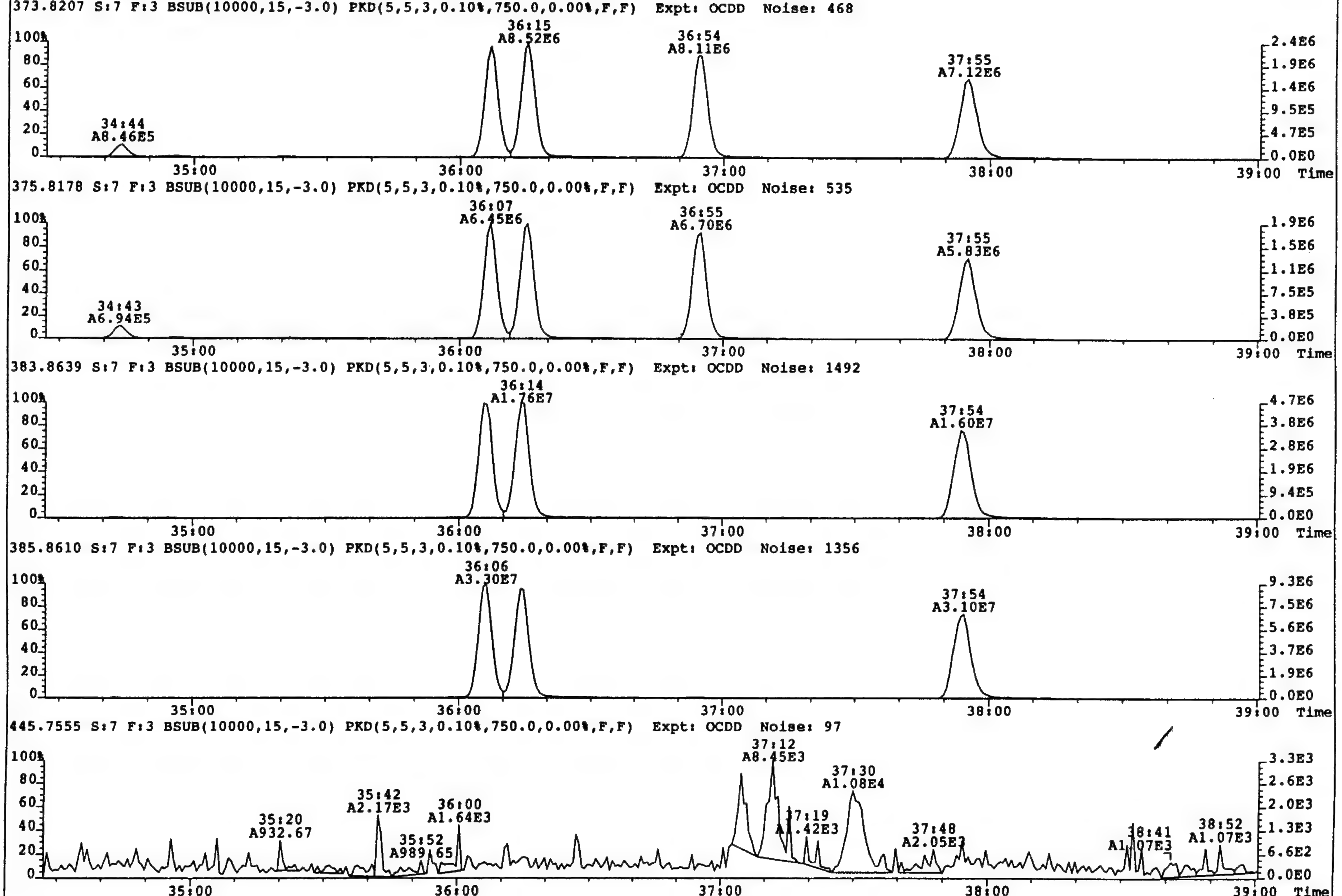
316.9824 S:7 Expt: OCDD

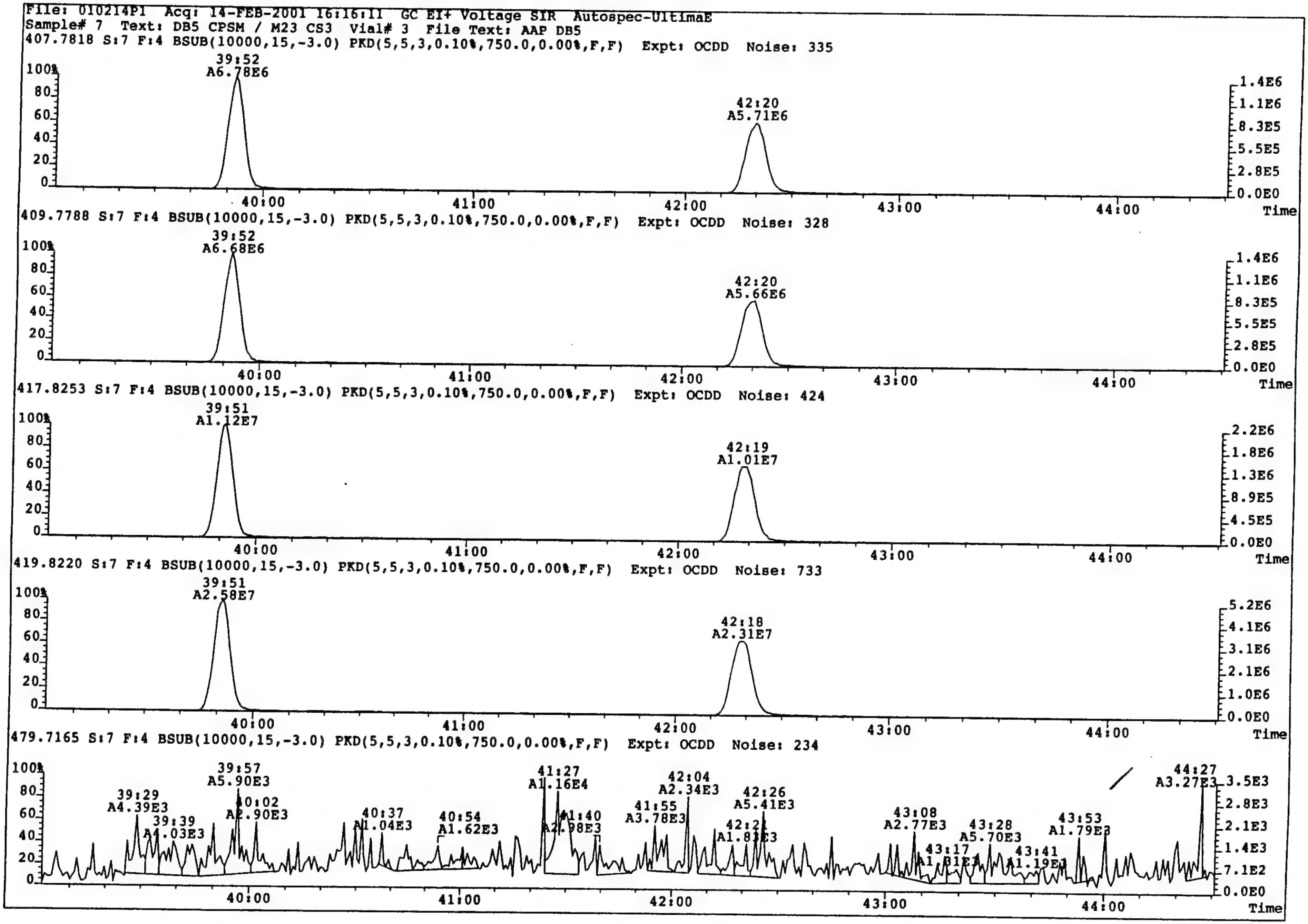


File: 010214P1 Acq: 14-FEB-2001 16:16:11 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 7 Text: DB5 CPSM / M23 CS3 Vial# 3 File Text: AAP DB5

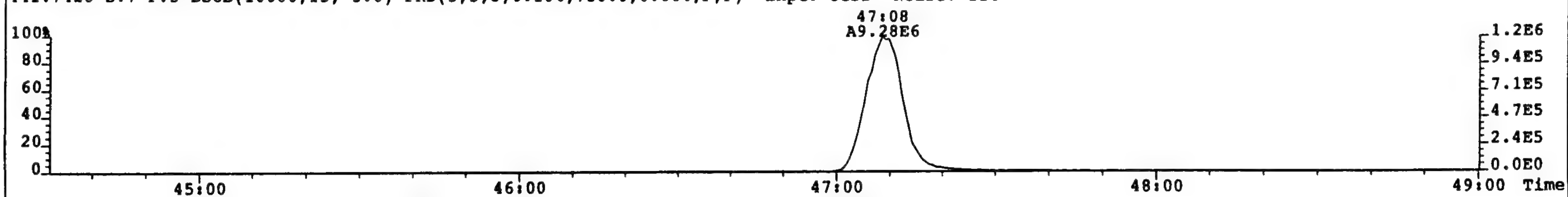


File: 010214P1 Acq: 14-FEB-2001 16:16:11 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 7 Text: DB5 CPSM / M23 CS3 Vial# 3 File Text: AAP DB5

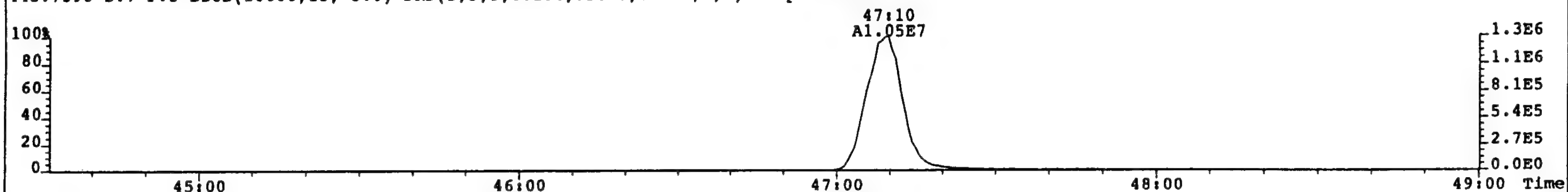



File: 010214P1 Acq: 14-FEB-2001 16:16:11 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 7 Text: DB5 CPSM / M23 CS3 Vial# 3 File Text: AAP DB5
407.7818 S:7 F:4 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 335
39:52 A6.78E6
42:20 A5.71E6
409.7788 S:7 F:4 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 328
39:52 A6.68E6
42:20 A5.66E6
417.8253 S:7 F:4 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 424
39:51 A1.12E7
42:19 A1.01E7
419.8220 S:7 F:4 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 733
39:51 A2.58E7
42:18 A2.31E7
479.7165 S:7 F:4 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 234
39:29 A4.39E3
39:39 A4.03E3
39:57 A5.90E3
40:02 A2.90E3
40:37 A1.04E3
40:54 A1.62E3
41:27 A1.16E4
41:40 A2.98E3
41:55 A3.78E3
42:04 A2.34E3
42:21 A1.83E3
42:26 A5.41E3
43:08 A2.77E3
43:17 A1.81E3
43:28 A5.70E3
43:41 A1.19E3
43:53 A1.79E3
44:27 A3.27E3
100%
80
60
40
20
0
40:00
41:00
42:00
43:00
44:00
Time
1.4E6
1.1E6
8.3E5
5.5E5
2.8E5
0.0E0
2.2E6
1.8E6
1.3E6
8.9E5
4.5E5
5.2E6
4.1E6
3.1E6
2.1E6
1.0E6
3.5E3
2.8E3
2.1E3
1.4E3
7.1E2

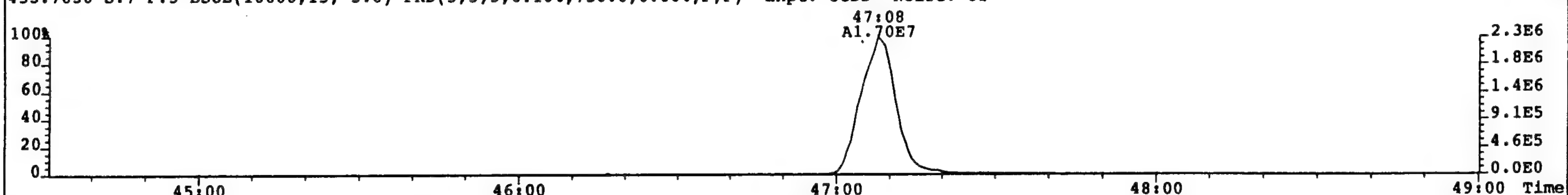
File: 010214P1 Acq: 14-FEB-2001 16:16:11 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 7 Text: DB5 CPSM / M23 CS3 Vial# 3 File Text: AAP DB5
441.7428 S:7 F:5 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 114



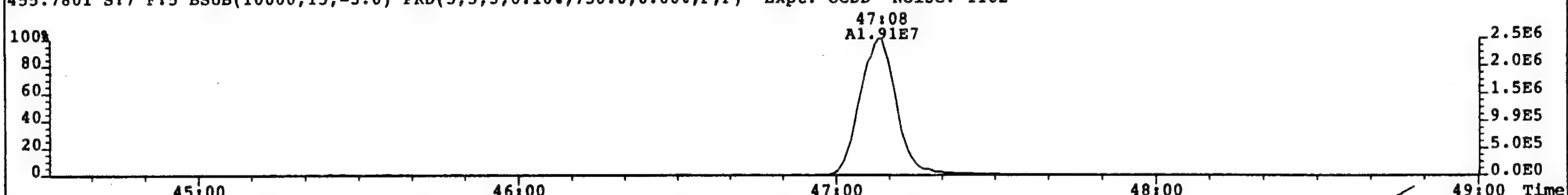
443.7398 S:7 F:5 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 228



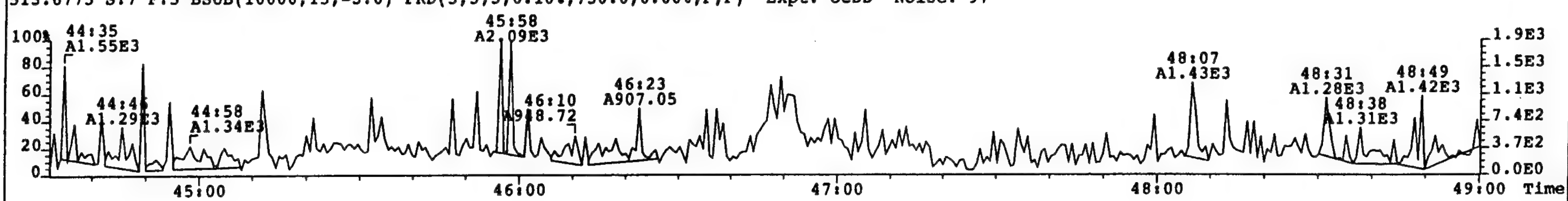
453.7830 S:7 F:5 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 81



455.7801 S:7 F:5 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 1182



513.6775 S:7 F:5 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 97



YT

PCDD/PCDF CALIBRATION VERIFICATION

Alta Analytical Perspectives

Reviewer: ce

Date: 24 Feb Ø1

Initial Calibration Date: 10/05/00

Instrument ID: MM-1 GC Column ID: DB-5

VER Data Filename: 010223P1 S#1 Analysis Date: 23-FEB-01 Time: 11:17:52

NATIVE ANALYTES	M/Z'S FORMING RATIO	ION ABUND. RATIO	QC LIMITS	Pass	CONC. FOUND	CONC. RANGE (ng/mL)
2,3,7,8-TCDD	M/M+2	0.79	0.65-0.89	y	5.81	3.75 - 6.25
1,2,3,7,8-PeCDD	M+2/M+4	1.58	1.32-1.78	y	27.34	18.75-31.25
1,2,3,4,7,8-HxCDD	M+2/M+4	1.24	1.05-1.43	y	26.17	18.75-31.25
1,2,3,6,7,8-HxCDD	M+2/M+4	1.26	1.05-1.43	y	26.81	18.75-31.25
1,2,3,7,8,9-HxCDD	M+2/M+4	1.26	1.05-1.43	y	26.29	18.75-31.25
1,2,3,4,6,7,8-HpCDD	M+2/M+4	1.03	0.88-1.20	y	25.50	18.75-31.25
OCDD	M+2/M+4	0.89	0.76-1.02	y	53.07	37 - 65
2,3,7,8-TCDF	M/M+2	0.75	0.65-0.89	y	4.88	3.75 - 6.25
1,2,3,7,8-PeCDF	M+2/M+4	1.52	1.32-1.78	y	24.99	18.75-31.25
2,3,4,7,8-PeCDF	M+2/M+4	1.53	1.32-1.78	y	25.04	18.75-31.25
1,2,3,4,7,8-HxCDF	M+2/M+4	1.21	1.05-1.43	y	24.01	18.75-31.25
1,2,3,6,7,8-HxCDF	M+2/M+4	1.24	1.05-1.43	y	24.29	18.75-31.25
2,3,4,6,7,8-HxCDF	M+2/M+4	1.20	1.05-1.43	y	23.46	18.75-31.25
1,2,3,7,8,9-HxCDF	M+2/M+4	1.23	1.05-1.43	y	23.49	18.75-31.25
1,2,3,4,6,7,8-HpCDF	M+2/M+4	1.02	0.88-1.20	y	23.60	18.75-31.25
1,2,3,4,7,8,9-HpCDF	M+2/M+4	1.02	0.88-1.20	y	22.37	18.75-31.25
OCDF	M+2/M+4	0.87	0.76-1.02	y	49.37	35 - 65

Analyst: GAG

Date: 23 Feb01

PCDD/PCDF CALIBRATION VERIFICATION

Alta Analytical Perspectives

Reviewer: Ce

Date: 24 Feb 01

Initial Calibration Date: 10/05/00

Instrument ID: MM-1 GC Column ID: DB-5

VER Data Filename: 010223P1 S#1 Analysis Date: 23-FEB-01 Time: 11:17:52

LABELED COMPOUNDS	M/Z'S FORMING RATIO	ION ABUND. RATIO	QC LIMITS	Pass	CONC. FOUND	CONC. RANGE (ng/mL)
13C-2,3,7,8-TCDD	M/M+2	0.80	0.65-0.89	y	91.5	70.0 - 130.0
13C-1,2,3,7,8-PeCDD	M+2/M+4	1.57	1.32-1.78	y	94.7	70.0 - 130.0
13C-1,2,3,6,7,8-HxCDD	M+2/M+4	1.20	1.05-1.43	y	96.1	70.0 - 130.0
13C-1,2,3,4,6,7,8-HpCDD	M+2/M+4	1.05	0.88-1.20	y	89.9	70.0 - 130.0
13C-OCDD	M+2/M+4	0.90	0.76-1.02	y	82.3	70.0 - 130.0
13C-2,3,7,8-TCDF	M/M+2	0.79	0.65-0.89	y	90.0	70.0 - 130.0
13C-1,2,3,7,8-PeCDF	M+2/M+4	1.58	1.32-1.78	y	84.6	70.0 - 130.0
13C-1,2,3,6,7,8-HxCDF	M/M+2	0.52	0.43-0.59	y	96.1	70.0 - 130.0
13C-1,2,3,4,6,7,8-HpCDF	M/M+2	0.43	0.37-0.51	y	87.2	70.0 - 130.0
13C-OCDF	M+2/M+4	0.84	0.76-1.02	y	81.8	70.0 - 130.0
37Cl-2,3,7,8-TCDD					108.0	75.0 - 125.0
13C-2,3,4,7,8-PeCDF	M+2/M+4	1.58	1.32-1.78	y	104.8	75.0 - 125.0
13C-1,2,3,4,7,8-HxCDD	M+2/M+4	1.31	1.05-1.43	y	100.9	75.0 - 125.0
13C-1,2,3,4,7,8-HxCDF	M/M+2	0.52	0.43-0.59	y	102.2	75.0 - 125.0
13C-1,2,3,4,7,8,9-HpCDF	M/M+2	0.43	0.37-0.51	y	96.1	75.0 - 125.0
13C-1,2,3,7,8,9-HxCDF	M/M+2	0.53	0.43-0.59	y	96.0	75.0 - 125.0

Analyst: GAG

Date: 24 Feb 01

Client ID: DB5 CPSM / M23 CS3
Lab ID: CS3RC

Filename: 010223P1 S: 1 Acq: 23-FEB-01 11:17:52
GC Column ID: db-5 ICal: MM1_M23_0, wt/vol: 1.000

ConCal: 010223P1-
EndCal: 010223P1-

	Name	Resp	RA	RRF	RT	Conc	Qualif.	CDE	noise	Fac	DL	EMPC / Rec
	2,3,7,8-TCDD	3.72e+06	0.79 y	1.26	27:38	5.81			1252	2.5	0.0365	
	1,2,3,7,8-PeCDD	1.19e+07	1.58 y	1.01	33:06	27.3			120888	2.5	7.34	
	1,2,3,4,7,8-HxCDD	1.00e+07	1.24 y	1.14	37:01	26.2			2240	2.5	0.126	
	1,2,3,6,7,8-HxCDD	9.23e+06	1.26 y	1.02	37:08	26.8			2240	2.5	0.140	
	1,2,3,7,8,9-HxCDD	1.01e+07	1.26 y	1.14	37:27	26.3			2240	2.5	0.126	
	1,2,3,4,6,7,8-HpCDD	8.79e+06	1.03 y	1.13	41:25	25.5			2394	2.5	0.193	
	OCDD	1.23e+07	0.89 y	1.03	46:44	53.1			1218	2.5	0.181	
	2,3,7,8-TCDF	3.68e+06	0.75 y	1.05	26:45	4.88			2421	2.5	0.0638	
	1,2,3,7,8-PeCDF	1.59e+07	1.52 y	1.04	31:37	25.0			6785	2.5	0.259	
	2,3,4,7,8-PeCDF	1.61e+07	1.53 y	1.05	32:45	25.0			6785	2.5	0.255	
	1,2,3,4,7,8-HxCDF	1.25e+07	1.21 y	1.13	36:02	24.0			1783	2.5	0.0508	
	1,2,3,6,7,8-HxCDF	1.39e+07	1.24 y	1.24	36:11	24.3			1783	2.5	0.0464	
	2,3,4,6,7,8-HxCDF	1.26e+07	1.20 y	1.16	36:50	23.5			1783	2.5	0.0493	
	1,2,3,7,8,9-HxCDF	1.10e+07	1.23 y	1.02	37:51	23.5			1783	2.5	0.0564	
	1,2,3,4,6,7,8-HpCDF	1.07e+07	1.02 y	1.54	39:47	23.6			2071	2.5	0.0802	
	1,2,3,4,7,8,9-HpCDF	8.58e+06	1.02 y	1.30	42:14	22.4			2071	2.5	0.0952	
	OCDF	1.41e+07	0.87 y	1.15	47:03	49.4			1290	2.5	0.147	
												EMPC
	Total Tetra-Dioxins	1.49e+07	0.77 y	1.26	21:16	23.3			1252	2.5	0.0365	23.5
	Total Penta-Dioxins	3.16e+07	1.56 y	1.01	30:33	72.8			120888	2.5	7.34	73.1
	Total Hexa-Dioxins	3.06e+07	1.25 y	1.10	35:19	82.7			2240	2.5	0.130	83.2
	Total Hepta-Dioxins	1.64e+07	1.02 y	1.13	40:13	47.6			2394	2.5	0.193	48.2
	Total Tetra-Furans	9.06e+06	0.84 y	1.05	20:13	12.0			2421	2.5	0.0638	12.5
	1st Fnc. Penta-Furans	1.31e+07	1.64 y	1.05	28:45	20.5			2687	2.5	0.102	20.5
	Total Penta-Furans	4.49e+07	1.52 y	1.05	31:37	70.3			6785	2.5	0.257	
	PeCDF Totals:					90.8						91.1
	Total Hexa-Furans	5.17e+07	1.19 y	1.14	34:39	98.3			1783	2.5	0.0505	98.9
	Total Hepta-Furans	1.95e+07	1.02 y	1.42	39:47	46.3			2071	2.5	0.0870	46.9
												Rec
IS	13C-2,3,7,8-TCDD	5.08e+07	0.80 y	1.13	27:37	91.5						91.5
IS	13C-1,2,3,7,8-PeCDD	4.29e+07	1.57 y	0.93	33:06	94.7						94.7
IS	13C-1,2,3,6,7,8-HxCDD	3.36e+07	1.20 y	0.93	37:07	96.1						96.1
IS	13C-1,2,3,4,6,7,8-HpCDD	3.05e+07	1.05 y	0.91	41:24	89.9						89.9
IS	13C-OCDD	2.26e+07	0.90 y	0.73	46:42	82.3						82.3
IS	13C-2,3,7,8-TCDF	7.20e+07	0.79 y	1.06	26:43	90.0						90.0
IS	13C-1,2,3,7,8-PeCDF	6.11e+07	1.58 y	0.96	31:36	84.6						84.6
IS	13C-1,2,3,6,7,8-HxCDF	4.62e+07	0.52 y	1.28	36:10	96.1						96.1
IS	13C-1,2,3,4,6,7,8-HpCDF	2.95e+07	0.43 y	0.90	39:46	87.2						87.2
IS	13C-OCDF	2.49e+07	0.84 y	0.81	47:01	81.8						81.8
RS/RT	13C-1,2,3,4-TCDD	4.89e+07	0.81 y	1.00	26:57	100						-
RS	13C-1,2,3,4-TCDF	7.54e+07	0.77 y	1.00	25:20	100						-
RS/RT	13C-1,2,3,7,8,9-HxCDD	3.75e+07	1.26 y	1.00	37:26	100						-
PS	37Cl-2,3,7,8-TCDD	2.82e+07		0.51	27:38	108						108
PS	13C-2,3,4,7,8-PeCDF	6.24e+07	1.58 y	0.97	32:44	105						105
PS	13C-1,2,3,4,7,8-HxCDD	3.13e+07	1.31 y	0.92	37:00	101						101
PS	13C-1,2,3,4,7,8-HxCDF	4.30e+07	0.52 y	0.91	36:02	102						102
PS	13C-1,2,3,4,7,8,9-HpCDF	2.42e+07	0.43 y	0.85	42:13	96.1						96.1
AS	13C-1,2,3,7,8,9-HxCDF	3.85e+07	0.53 y	1.07	37:50	96.0						96.0

Reviewer: Ce
Date: 24Feb01

Analyst: GAG
Date: 24Feb01

FORM 5

PCDD/PCDF RT WINDOW AND ISOMER SPECIFICITY STANDARDS

Lab Name: Alta Analytical Perspectives Episode No.:

Contract No.: SAS No.:

Reviewer: ce

Instrument ID: MM-1 Initial Calibration Date: 10/5/00

RT Window Data Filename: 010223P1 S#1 Analysis Date: 23-FEB-01 Time: 11:17:52

Date: 24 Feb 01

DB-5 IS Data Filename: 010223P1 S#1 Analysis Date: 23-FEB-01 Time: 11:17:52

DB_225 IS Data Filename: Analysis Date: Time:

DB-5 RT WINDOW DEFINING STANDARDS RESULTS

ISOMERS	ABSOLUTE RT	ISOMERS	ABSOLUTE RT
1,3,6,8-TCDD (F)	23:52	1,3,6,8-TCDF (F)	21:41
1,2,8,9-TCDD (L)	28:38	1,2,8,9-TCDF (L)	28:48
1,2,4,7,9-PeCDD (F)	30:33	1,3,4,6,8-PeCDF (F)	28:45
1,2,3,8,9-PeCDD (L)	33:33	1,2,3,8,9-PeCDF (L)	33:51
1,2,4,6,7,9-HxCDD (F)	35:19	1,2,3,4,6,8-HxCDF (F)	34:39
1,2,3,7,8,9-HxCDD (L)	37:27	1,2,3,7,8,9-HxCDF (L)	37:51
1,2,3,4,6,7,9-HpCDD (F)	40:13	1,2,3,4,6,7,8-HpCDF (F)	39:47
1,2,3,4,6,7,8-HpCDD (L)	41:25	1,2,3,4,7,8,9-HpCDF (L)	42:14

(F) = First eluting isomer (DB-5); (L) = Last eluting isomer (DB-5).

==

ISOMER SPECIFICITY (IS) TEST STANDARD RESULTS

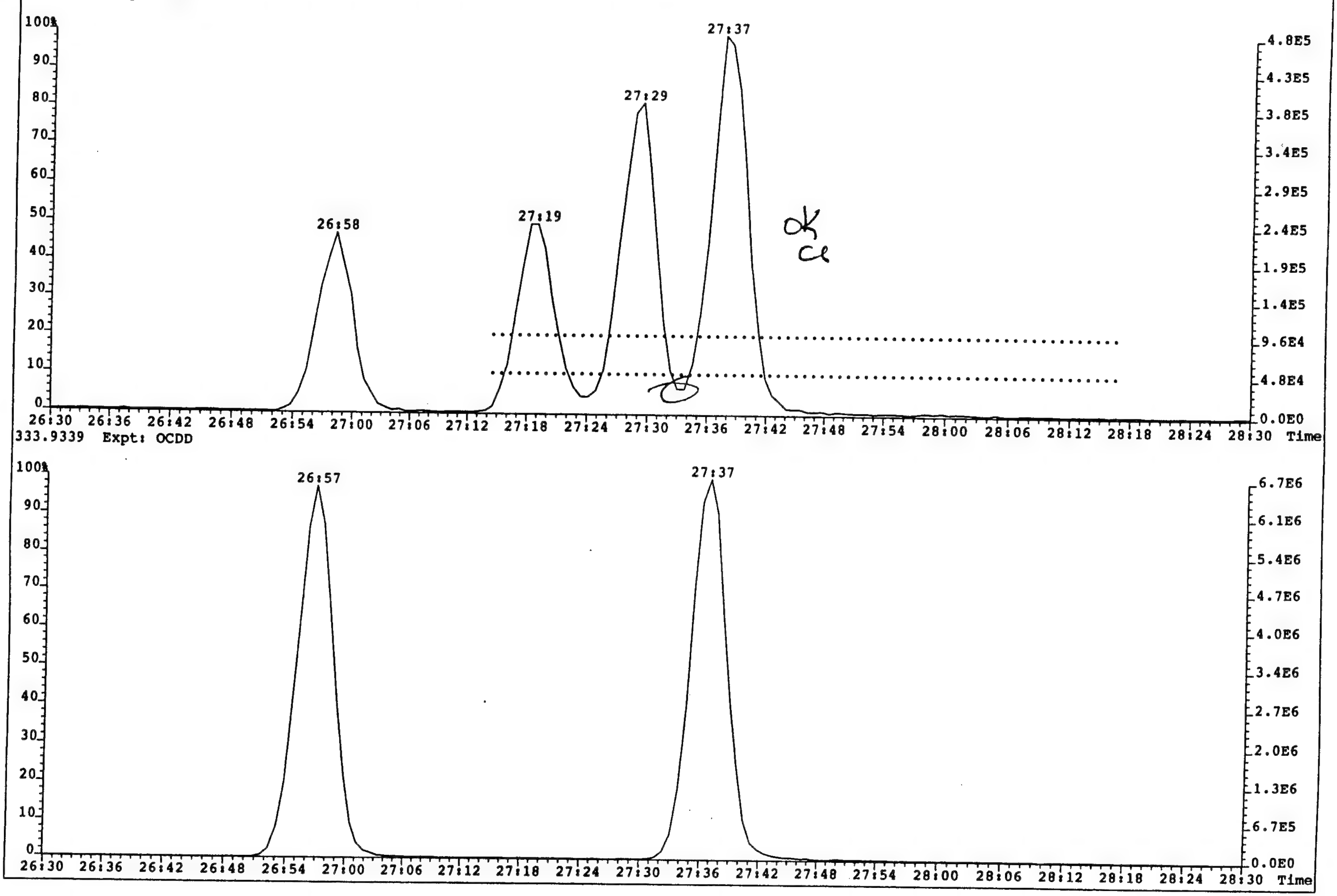
% VALLEY HEIGHT
BETWEEN
COMPARED PEAKS (1)

<25%

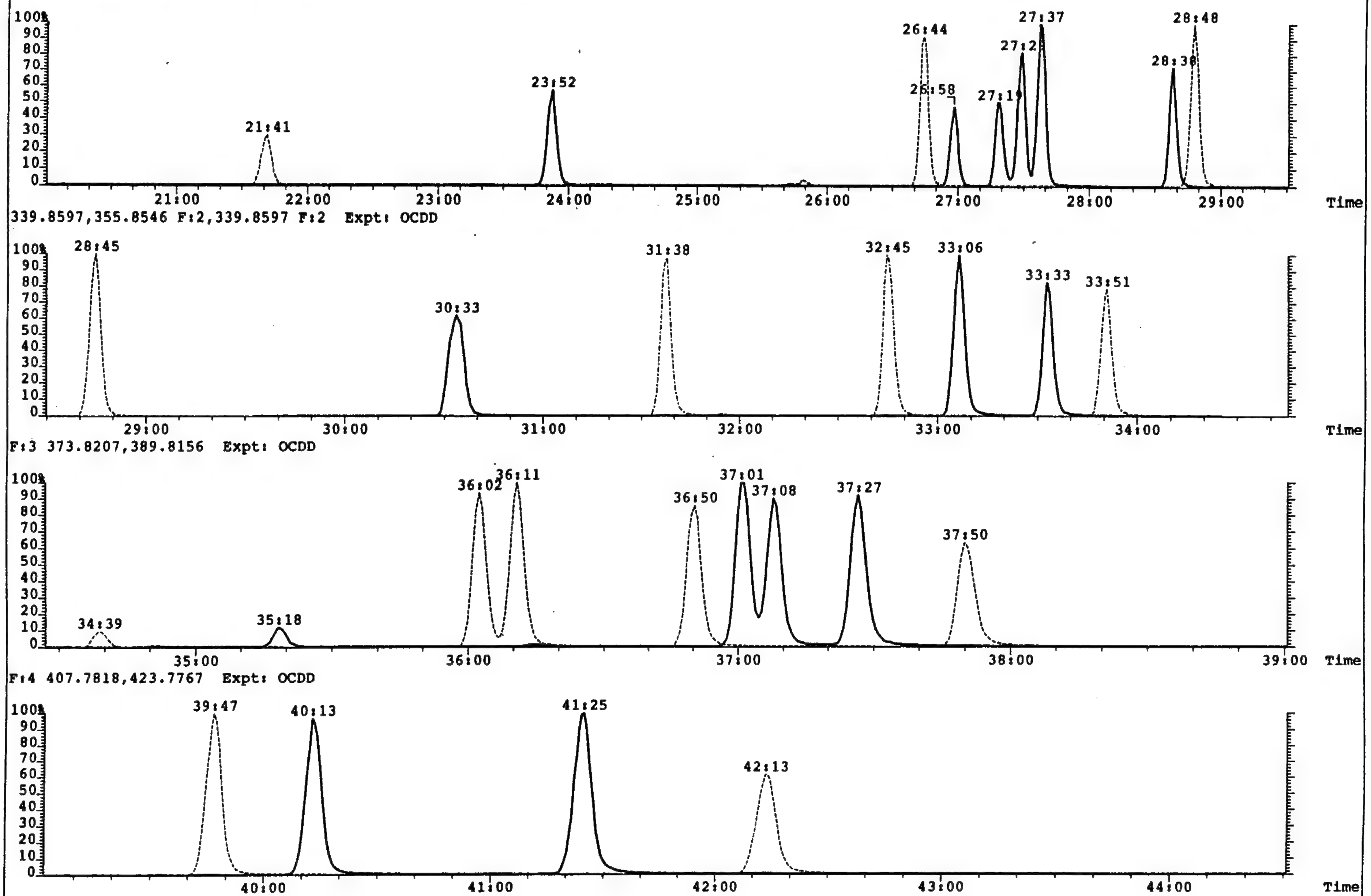
Analyst:

Date:

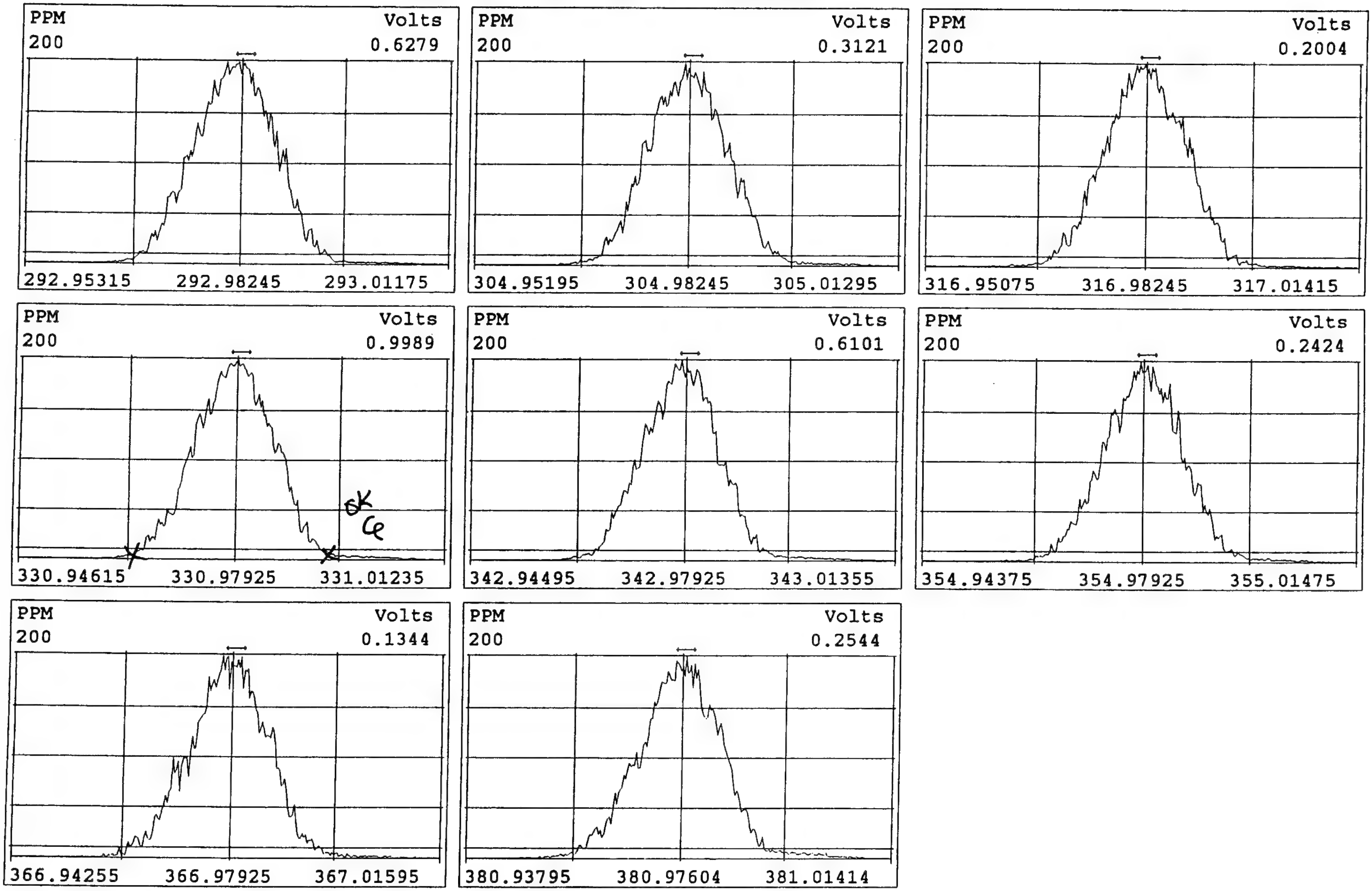
File: 010223P1 Acq: 23-FEB-2001 11:17:52 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 1 Text: DB5 CPSM / M23 CS3 Vial# 3 File Text: AAP DB5
321.8936 Expt: OCDD



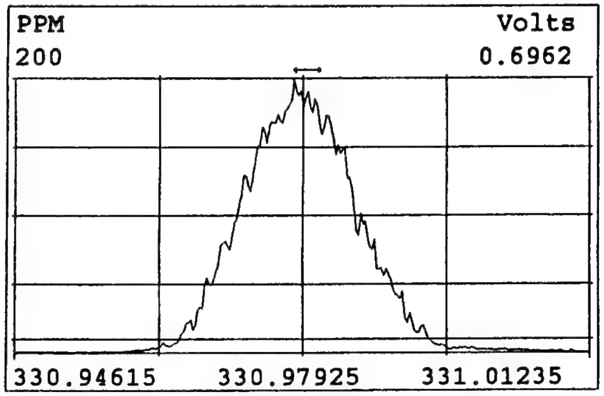
File: 010223P1 Acq: 23-FEB-2001 11:17:52 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 1 Text: DB5 CPSM / M23 CS3 Vial# 3 File Text: AAP DB5
305.8987,321.8936 Expt: OCDD

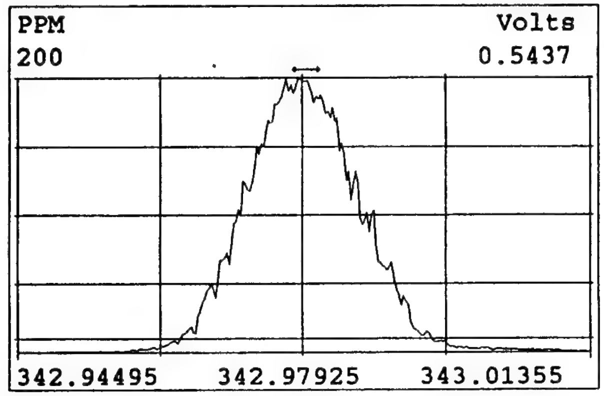


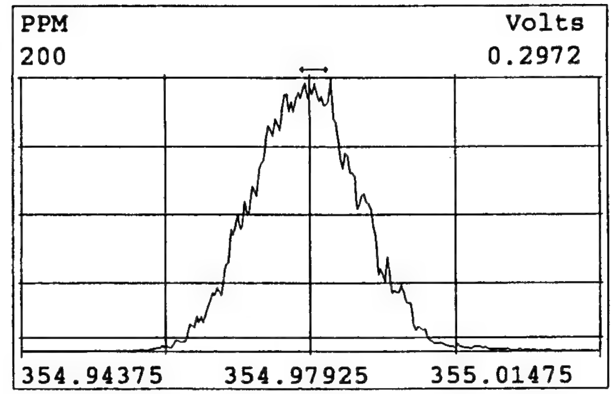
Peak Locate Examination:23-FEB-2001:11:15 File:010223P1
Experiment:OCDD Function:1 Reference:PFK2

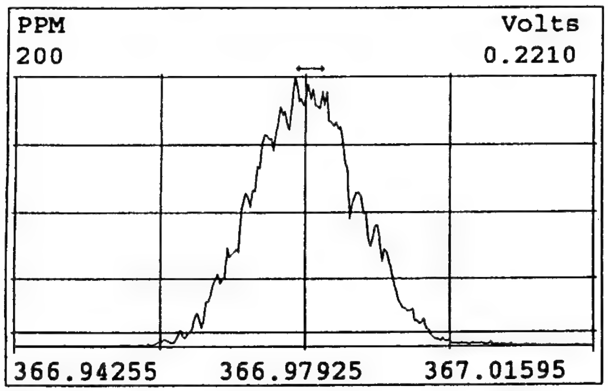


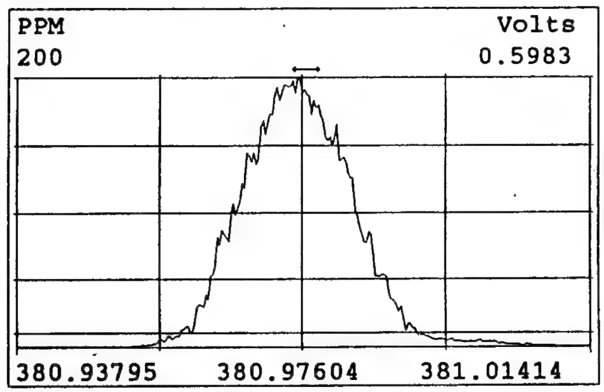
Peak Locate Examination:23-FEB-2001:11:16 File:010223P1
Experiment:OCDD Function:2 Reference:PFK2

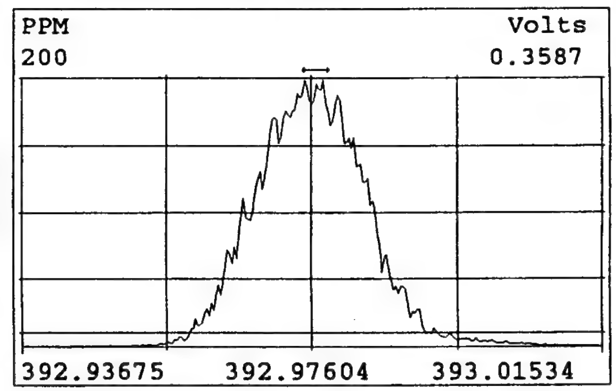


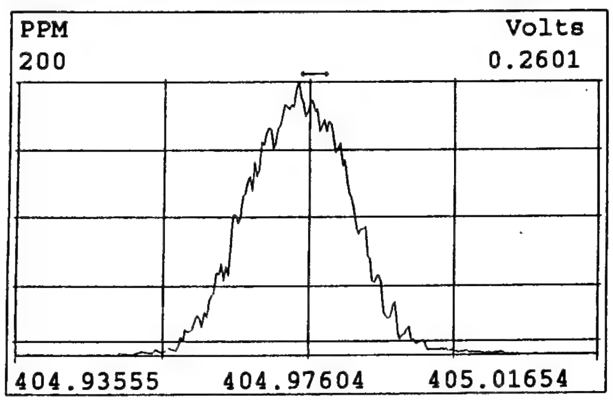


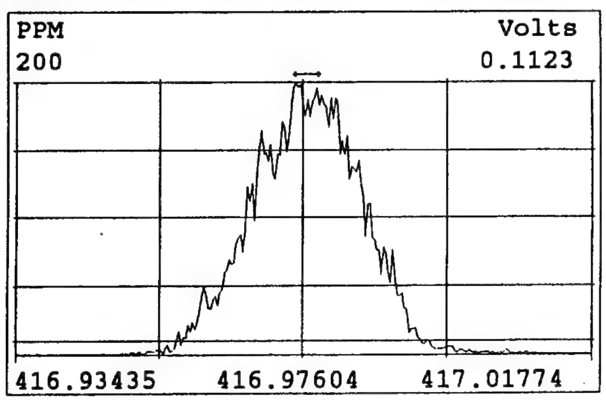




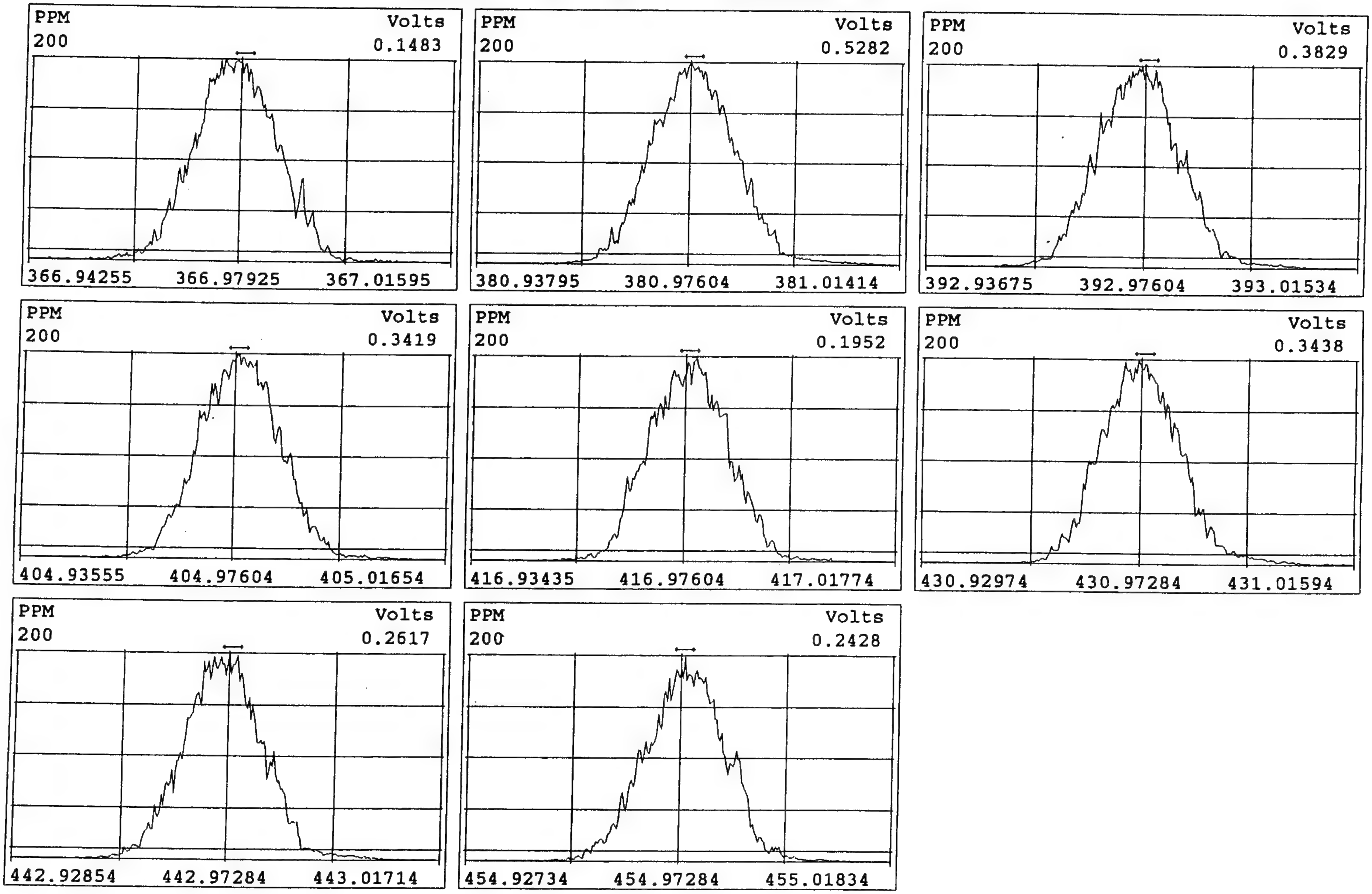




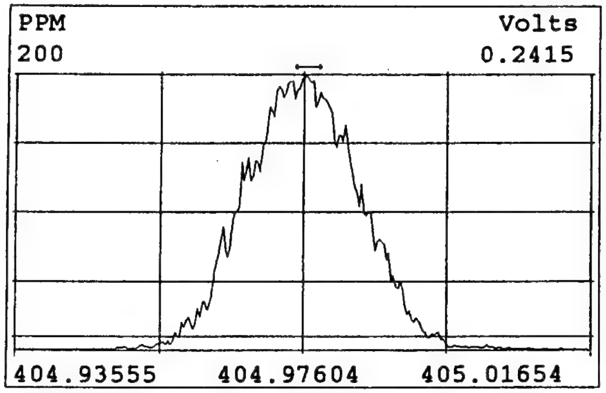


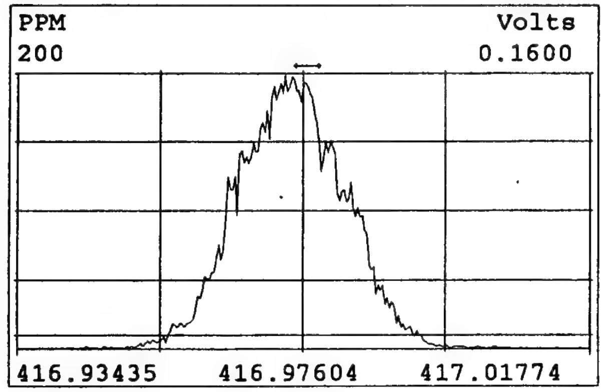


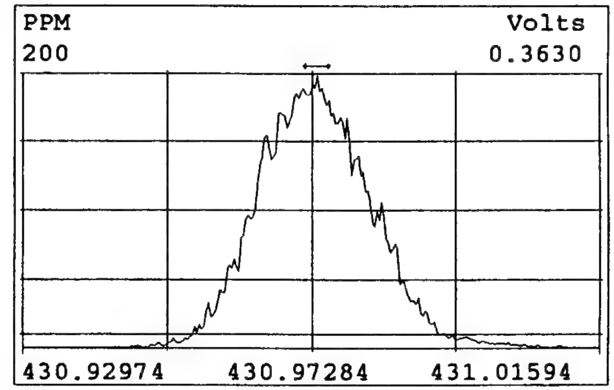
Peak Locate Examination:23-FEB-2001:11:16 File:010223P1
Experiment:OCDD Function:3 Reference:PFK2

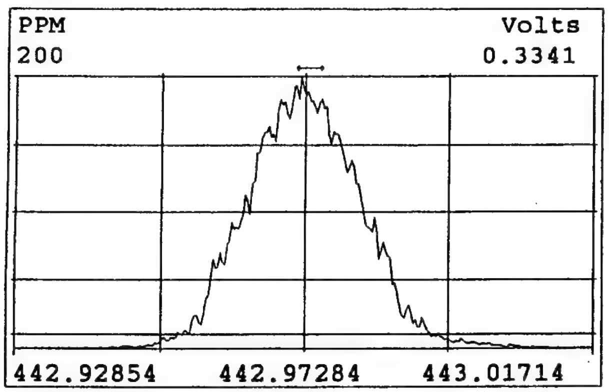


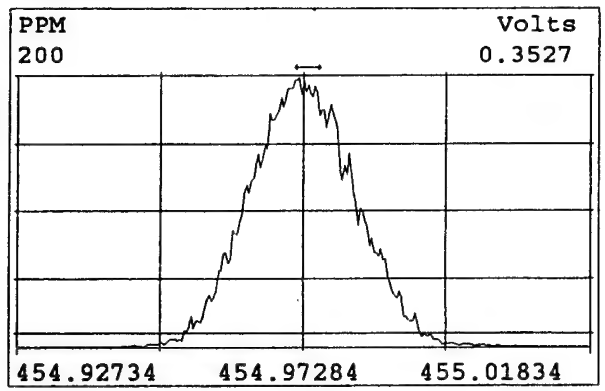
Peak Locate Examination:23-FEB-2001:11:16 File:010223P1
Experiment:OCDD Function:4 Reference:PFK2

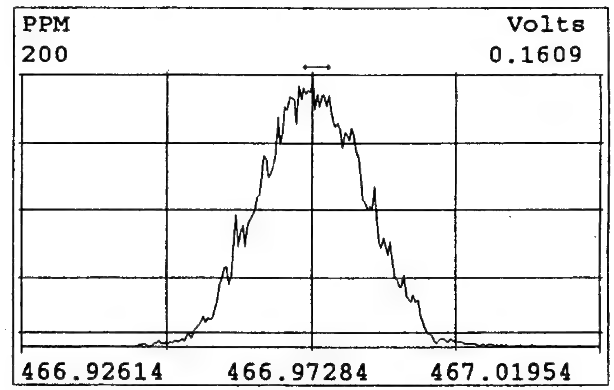


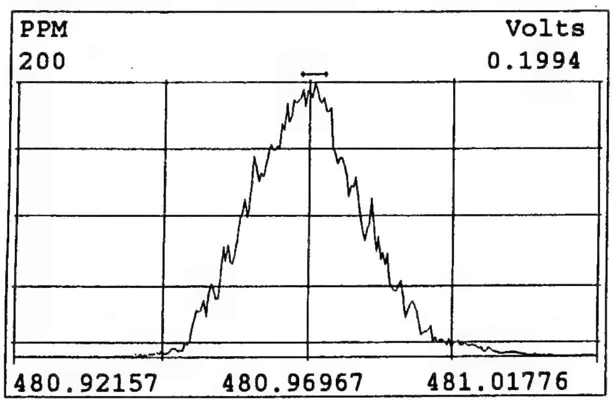




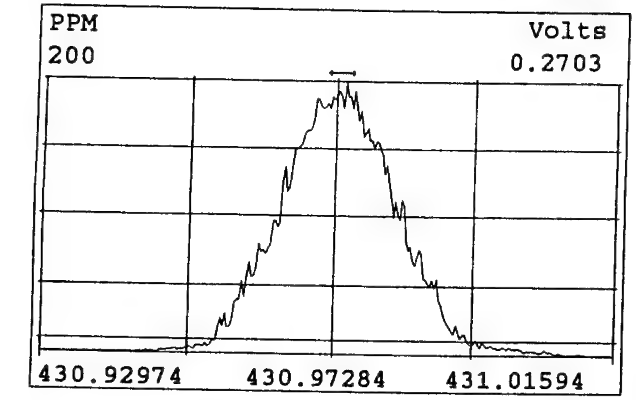


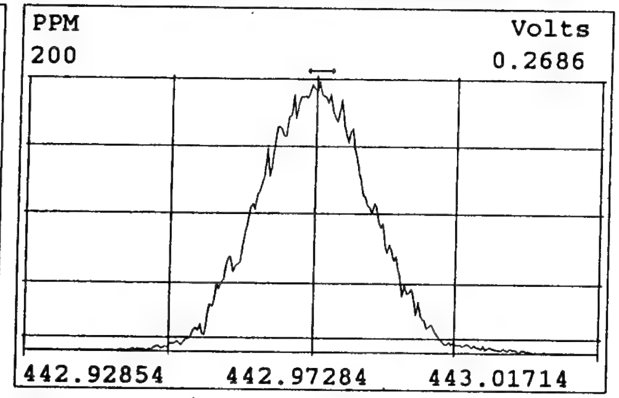


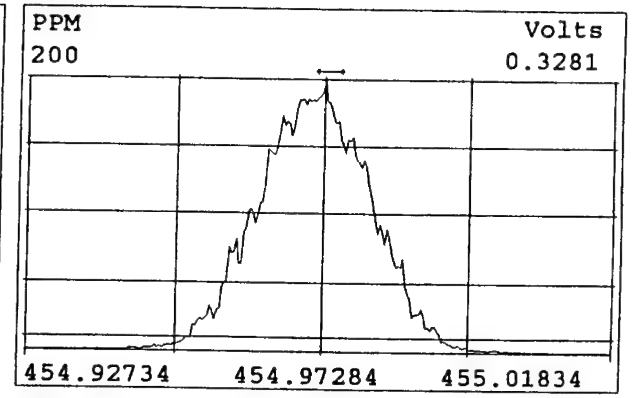


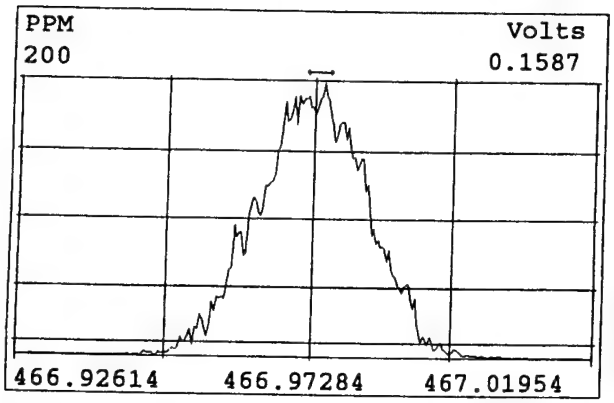


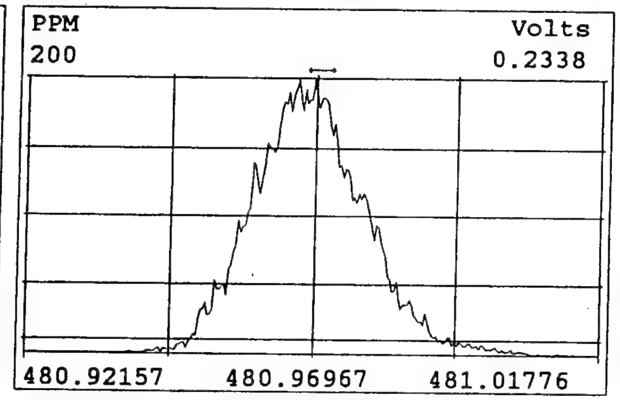
Peak Locate Examination:23-FEB-2001:11:17 File:010223P1
Experiment:OCDD Function:5 Reference:PFK2

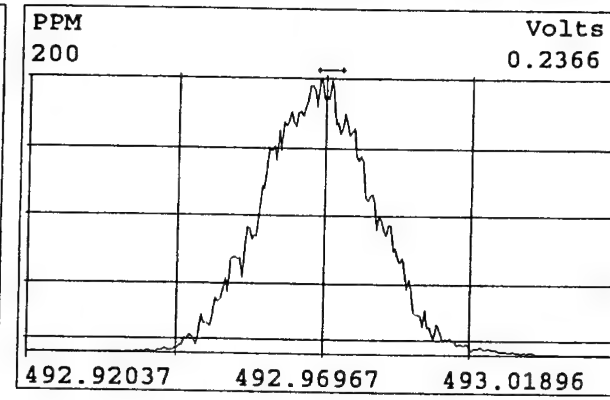


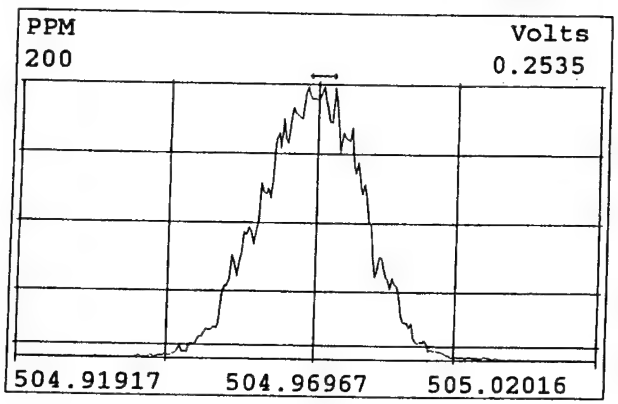


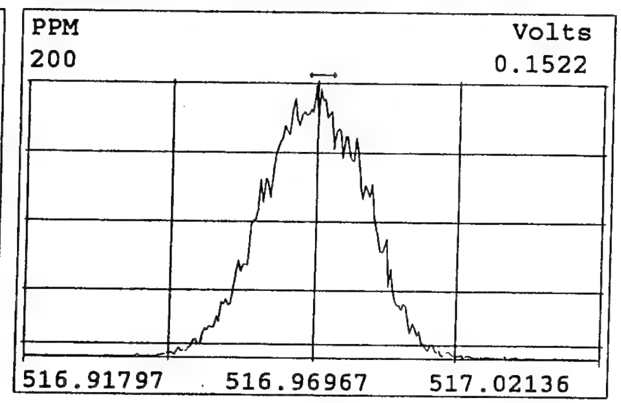




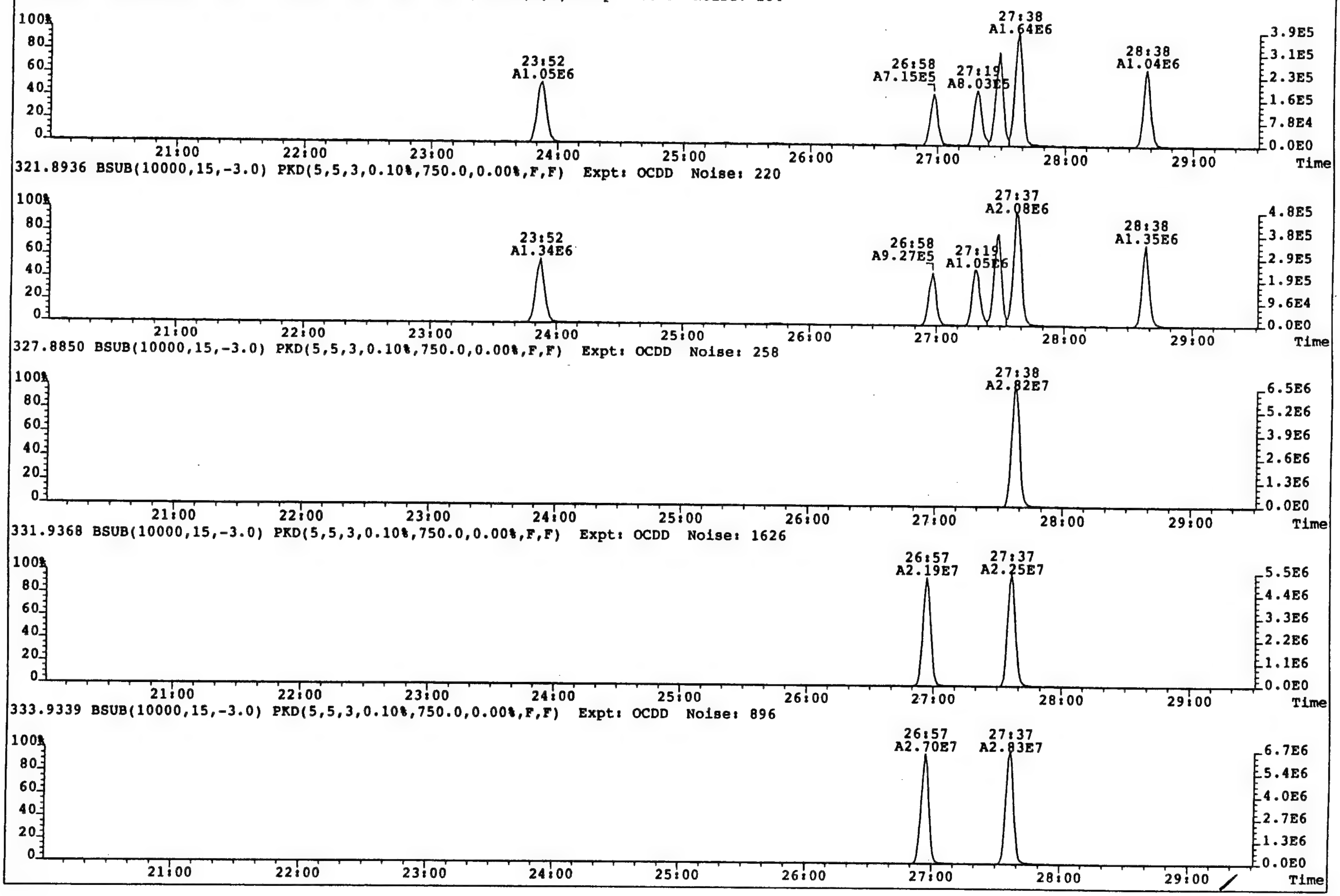




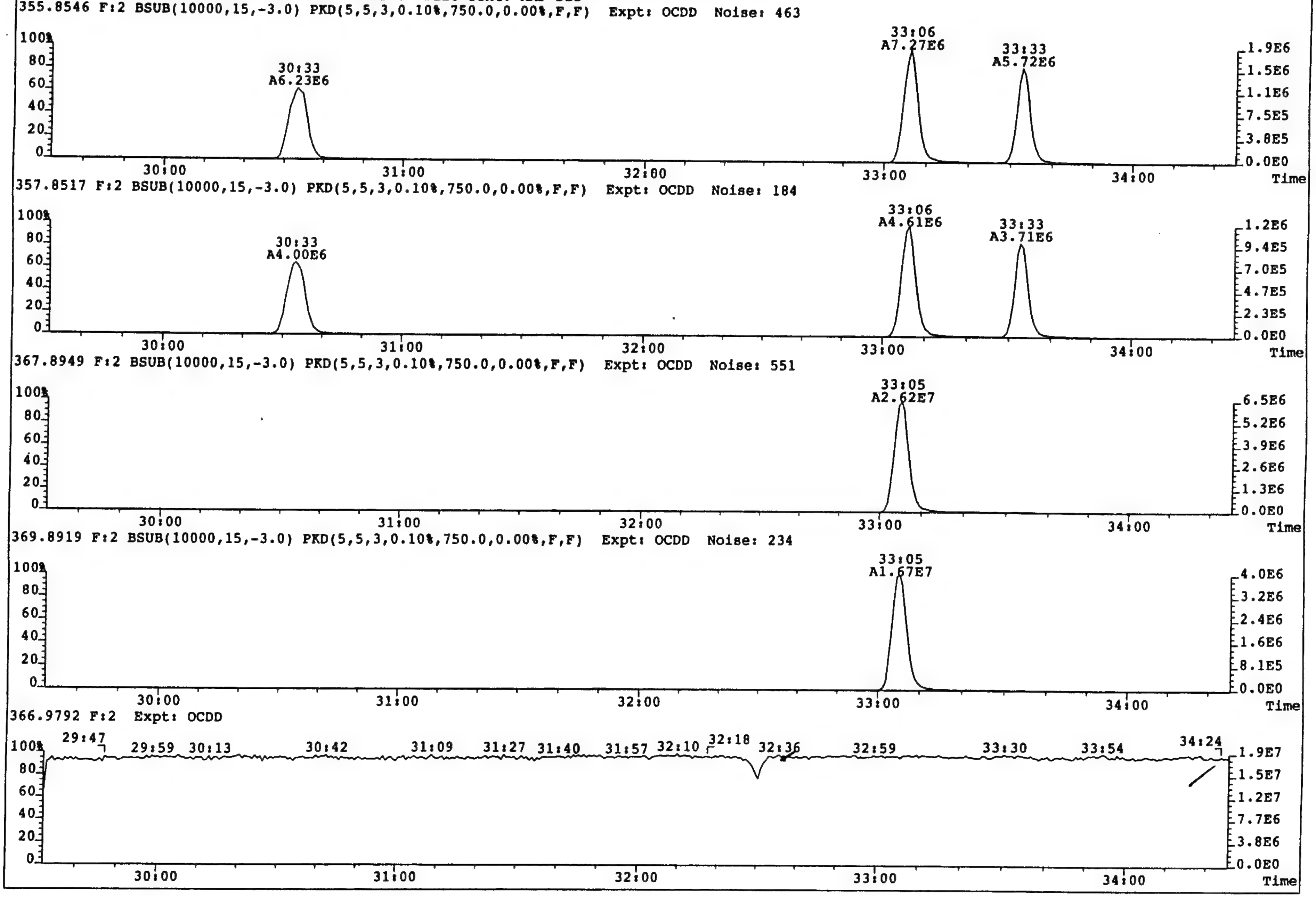




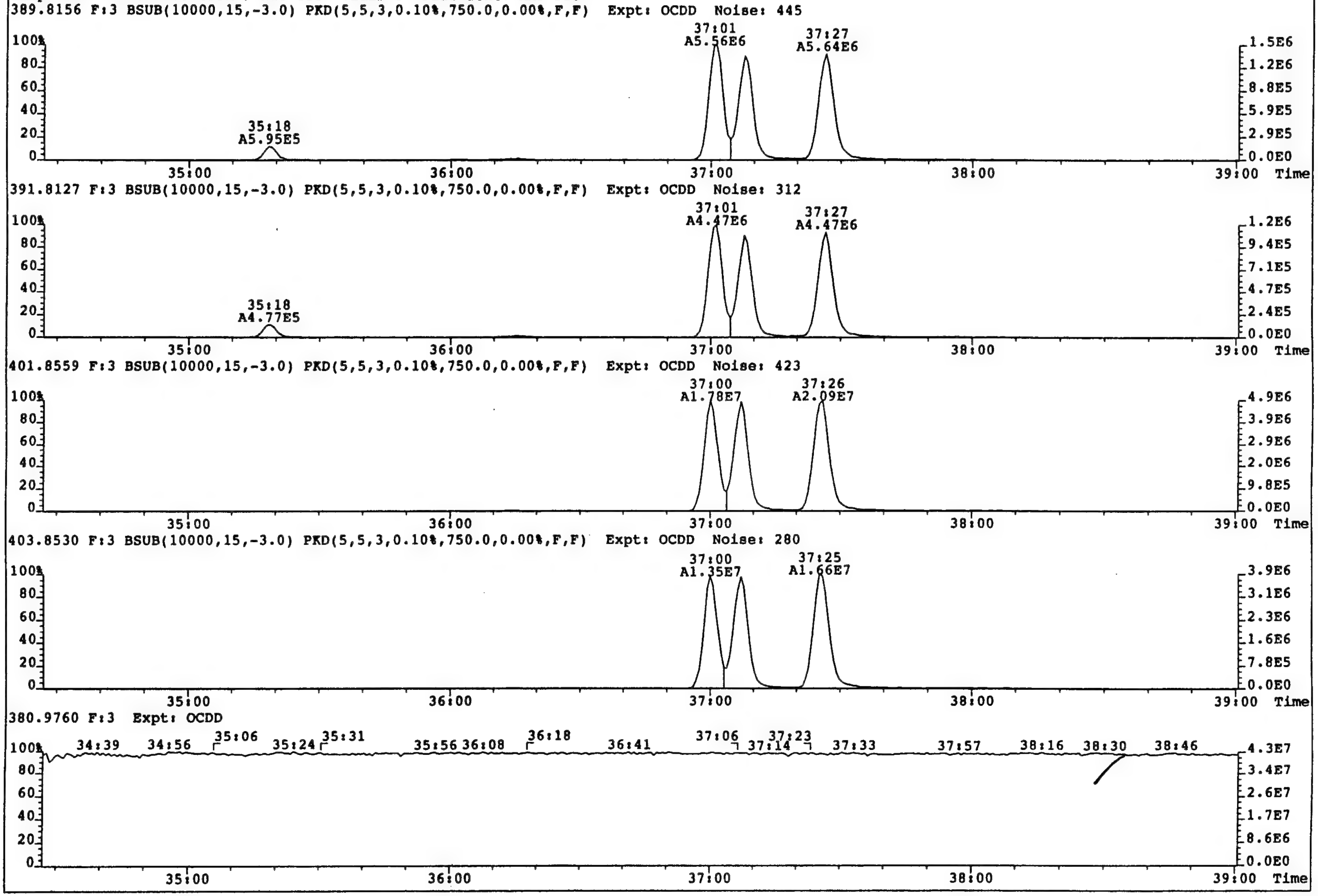
File: 010223P1 Acq: 23-FEB-2001 11:17:52 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 1 Text: DB5 CPSM / M23 CS3 Vial# 3 File Text: AAP DB5
319.8965 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 284



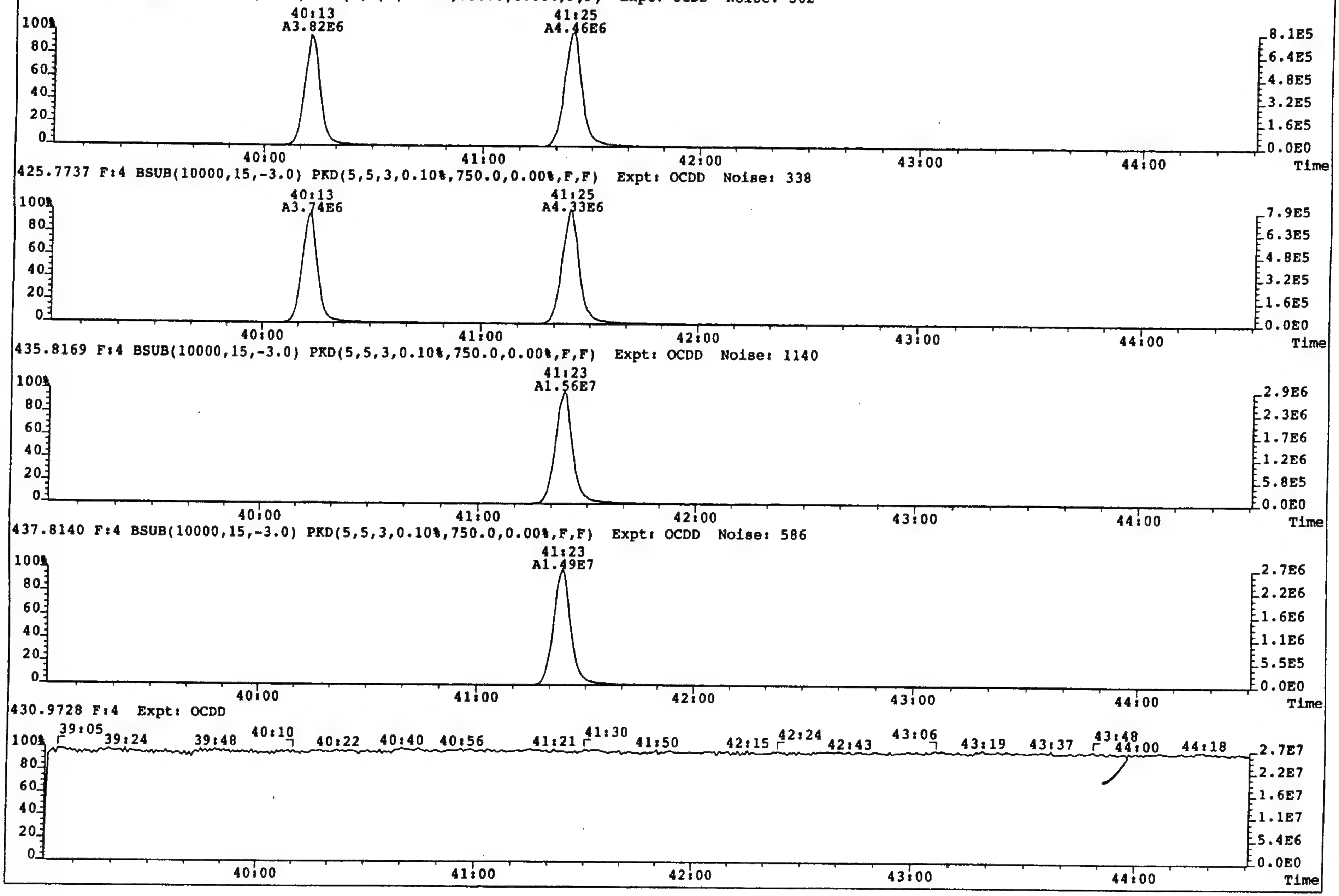
File: 010223P1 Acq: 23-FEB-2001 11:17:52 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 1 Text: DB5 CPSM / M23 CS3 Vial# 3 File Text: AAP DB5



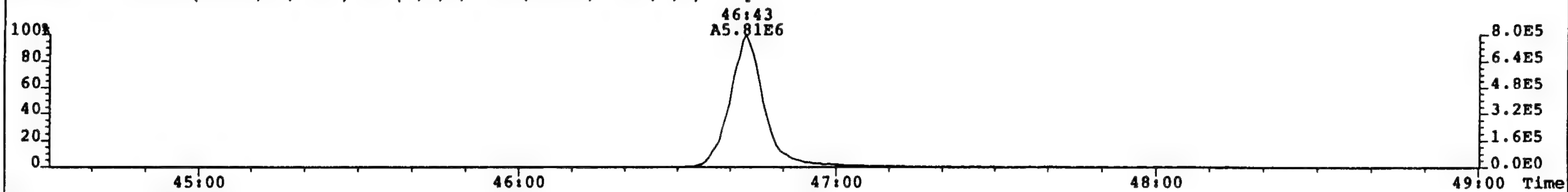
File: 010223P1 Acq: 23-FEB-2001 11:17:52 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 1 Text: DB5 CPSM / M23 CS3 Vial# 3 File Text: AAP DB5



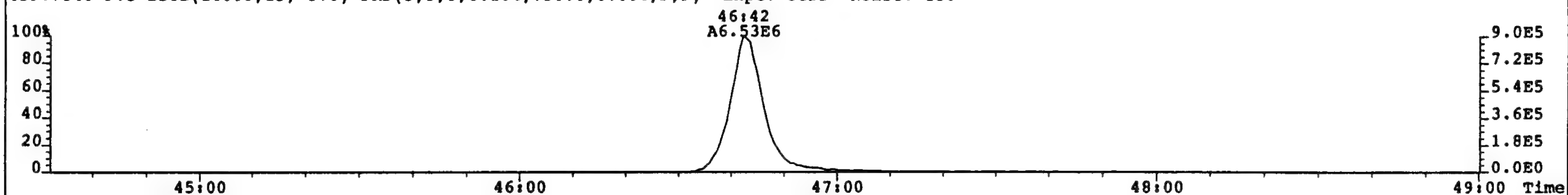
File: 010223P1 Acq: 23-FEB-2001 11:17:52 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 1 Text: DB5 CPSM / M23 CS3 Vial# 3 File Text: AAP DB5
423.7767 F:4 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 362



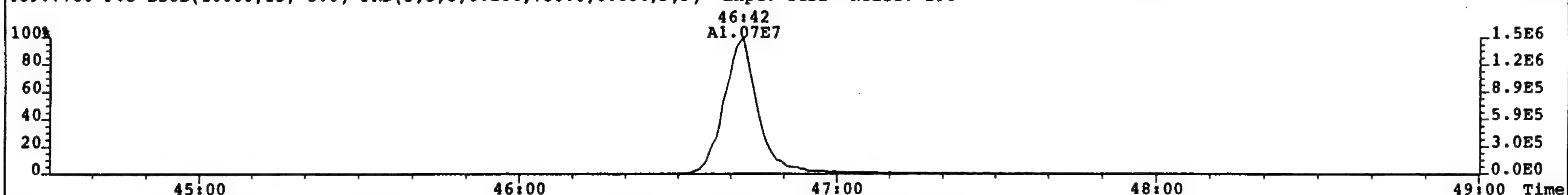
File: 010223P1 Acq: 23-FEB-2001 11:17:52 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 1 Text: DB5 CPSM / M23 CS3 Vial# 3 File Text: AAP DB5
457.7377 F:5 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 281



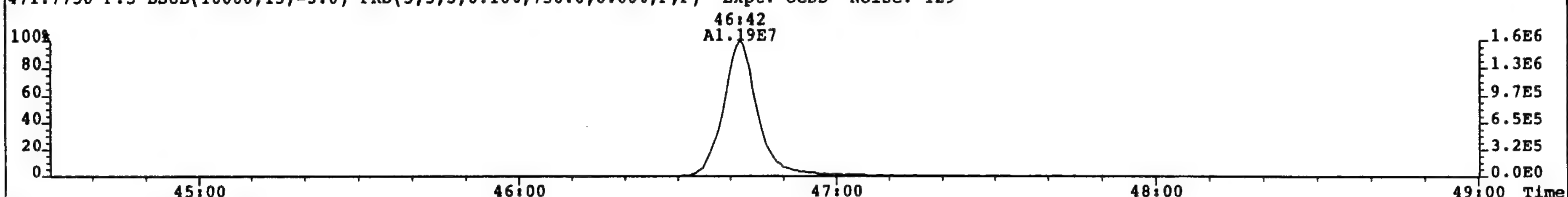
459.7348 F:5 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 130



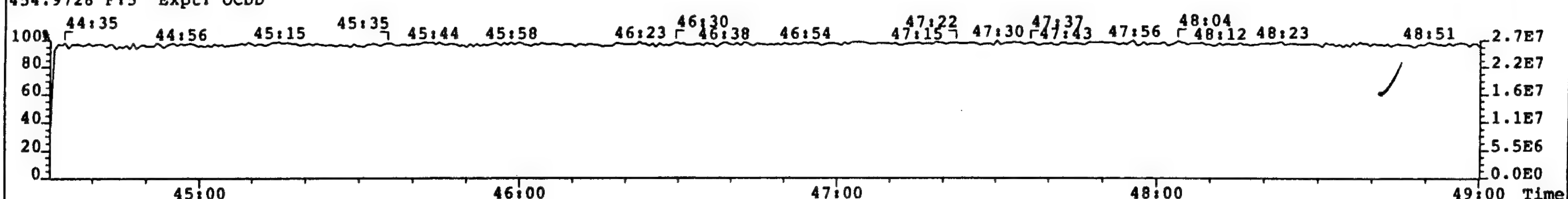
469.7780 F:5 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 290



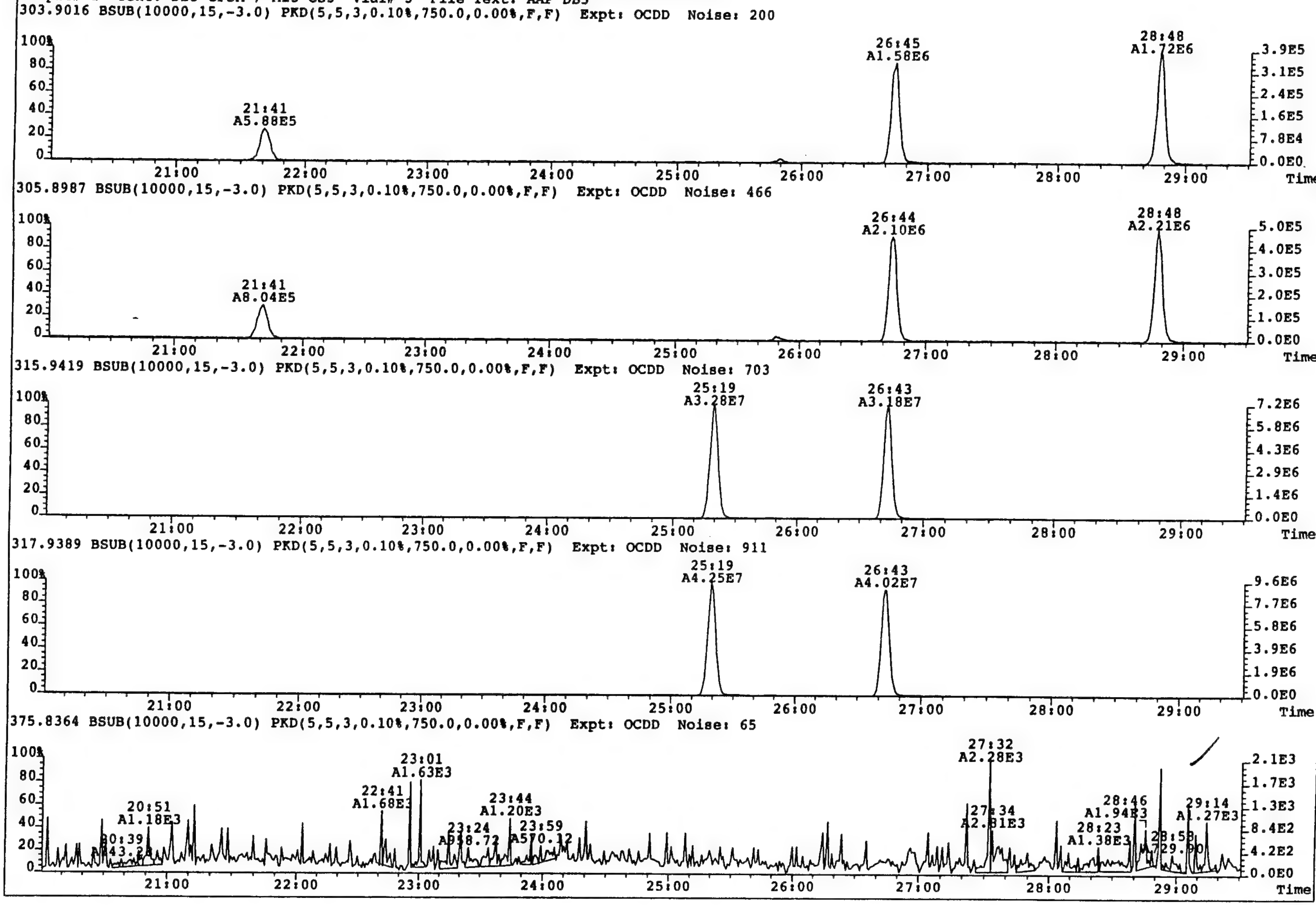
471.7750 F:5 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 129



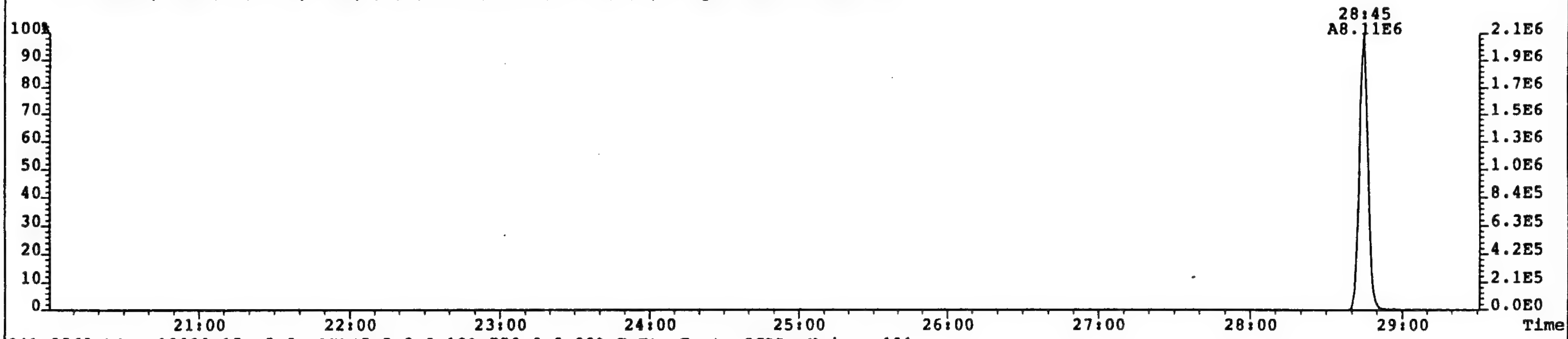
454.9728 F:5 Expt: OCDD



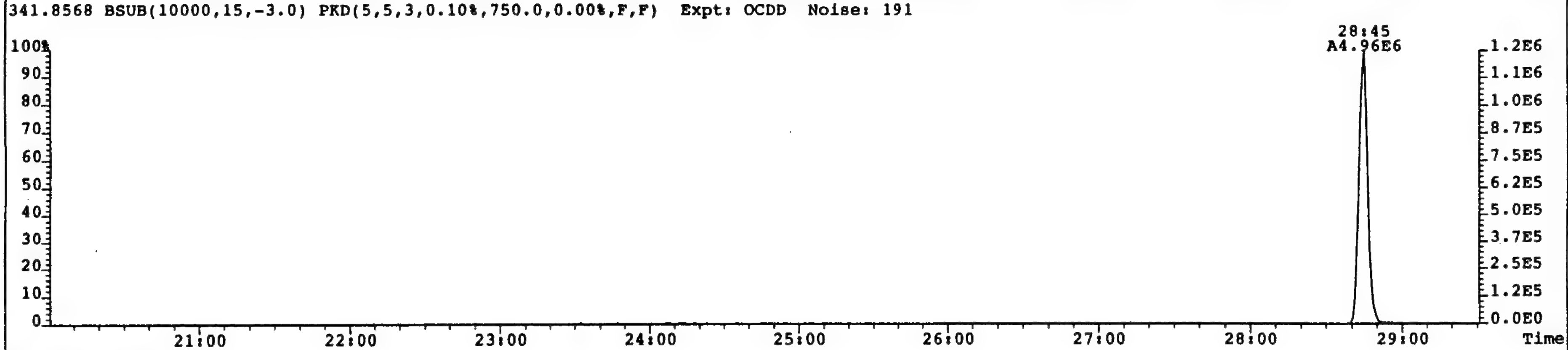
File: 010223P1 Acq: 23-FEB-2001 11:17:52 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 1 Text: DB5 CPSM / M23 CS3 Vial# 3 File Text: AAP DB5



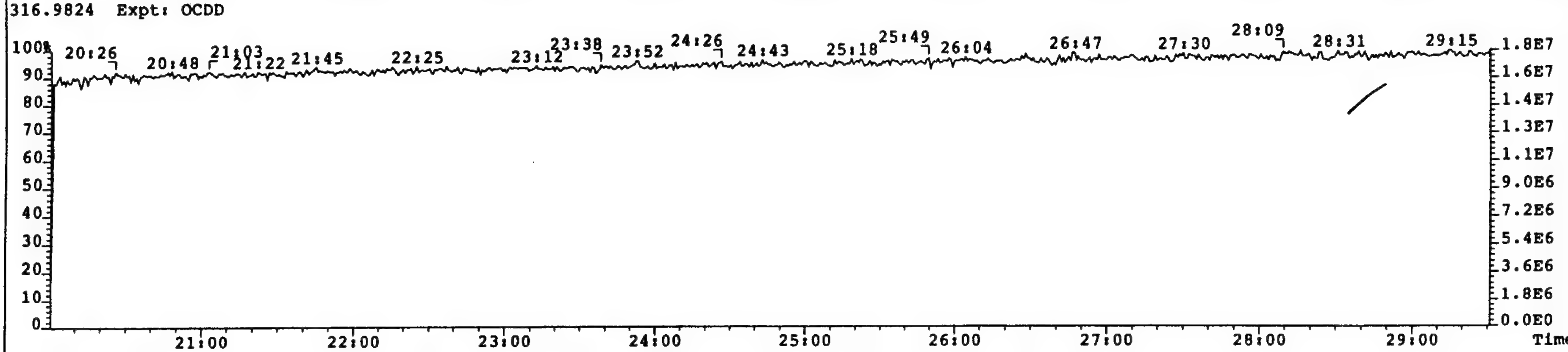
File: 010223P1 Acq: 23-FEB-2001 11:17:52 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 1 Text: DB5 CPSM / M23 CS3 Vial# 3 File Text: AAP DB5
339.8597 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 80

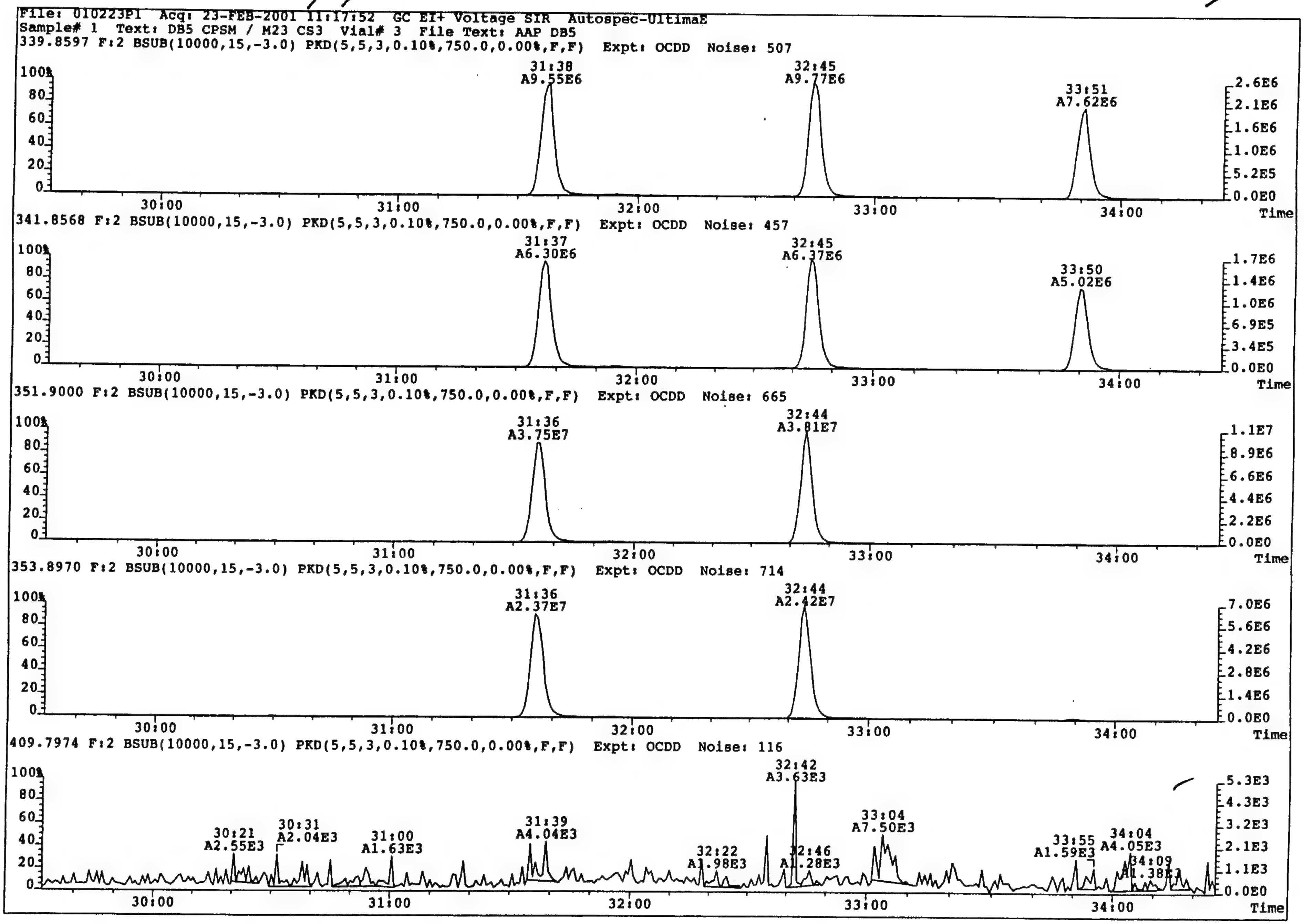


341.8568 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 191

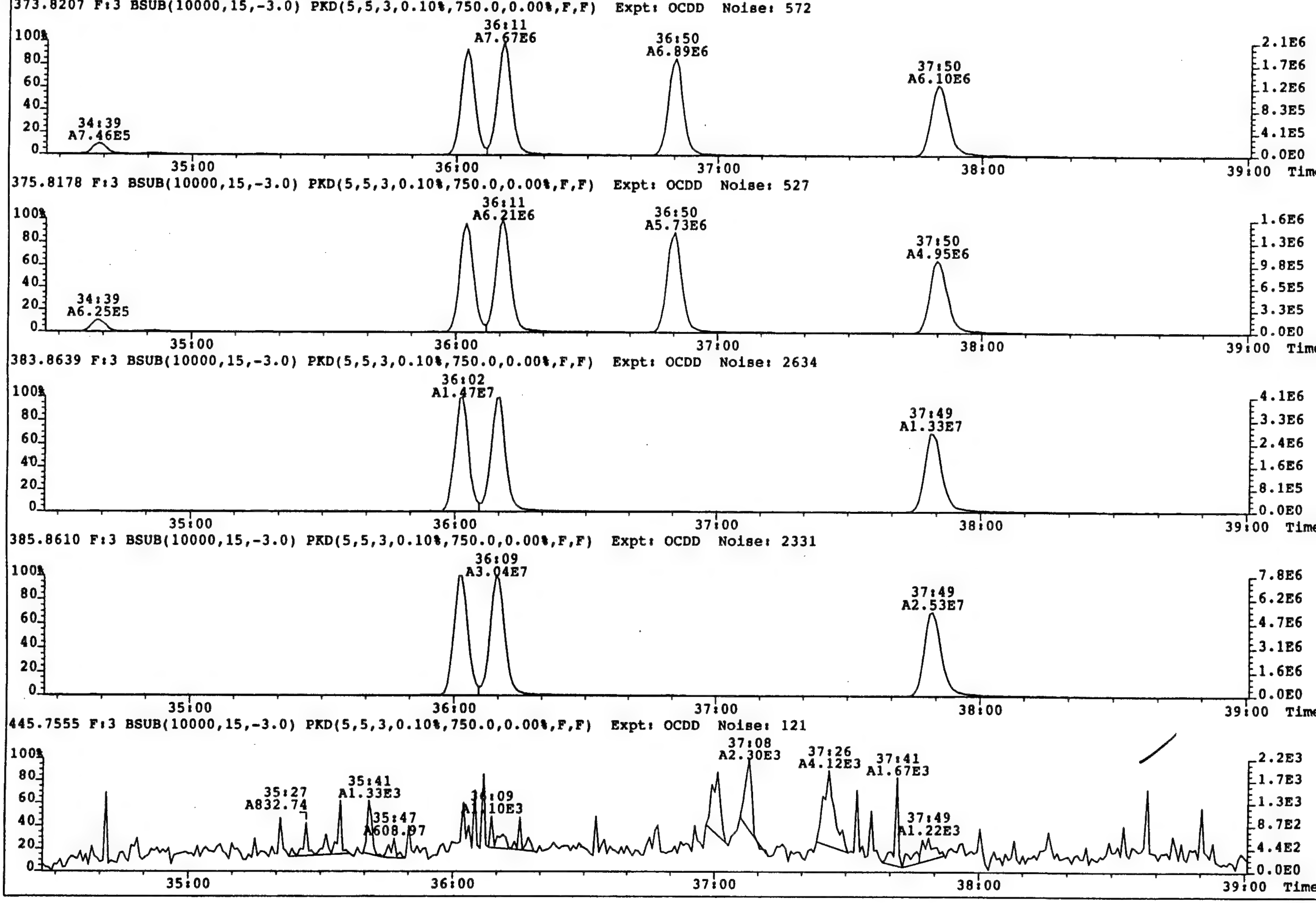


316.9824 Expt: OCDD

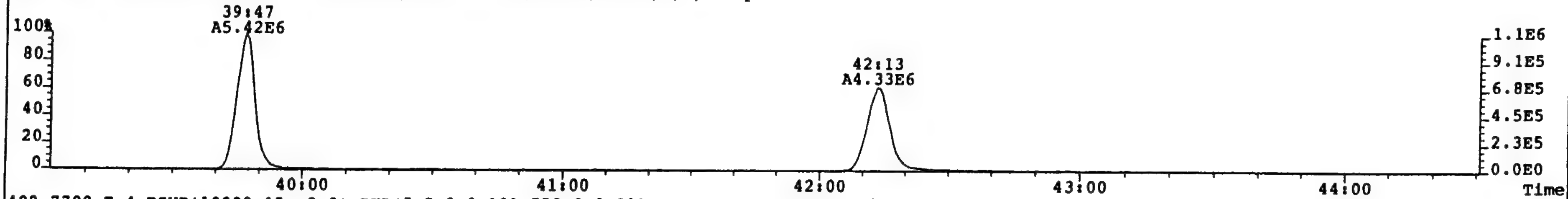



File: 010223P1 Acq: 23-FEB-2001 11:17:52 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 1 Text: DB5 CPSM / M23 CS3 Vial# 3 File Text: AAP DB5
339.8597 F:2 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 507
31:38 A9.55E6
32:45 A9.77E6
33:51 A7.62E6
341.8568 F:2 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 457
31:37 A6.30E6
32:45 A6.37E6
33:50 A5.02E6
351.9000 F:2 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 665
31:36 A3.75E7
32:44 A3.81E7
353.8970 F:2 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 714
31:36 A2.37E7
32:44 A2.42E7
409.7974 F:2 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 116
30:21 A2.55E3
30:31 A2.04E3
31:00 A1.63E3
31:39 A4.04E3
32:22 A1.98E3
32:42 A3.63E3
32:46 A1.28E3
33:04 A7.50E3
33:55 A1.59E3
34:04 A4.05E3
34:09 A1.38E3
Time

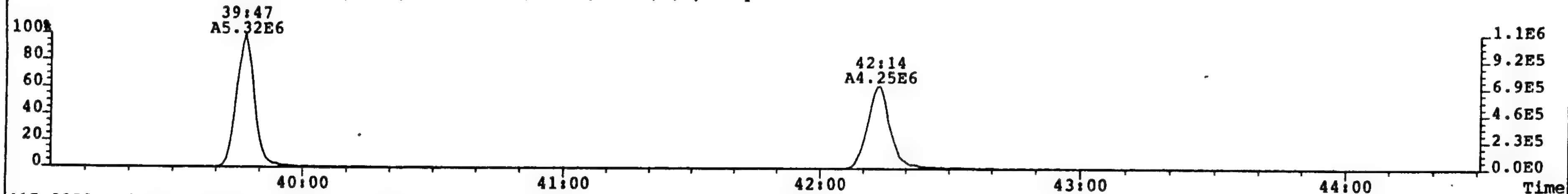
File: 010223P1 Acq: 23-FEB-2001 11:17:52 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 1 Text: DB5 CPSM / M23 CS3 Vial# 3 File Text: AAP DB5



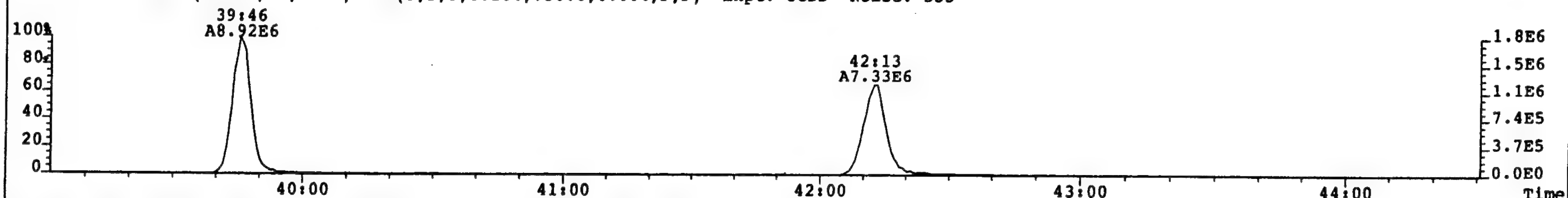
File: 010223P1 Acq: 23-FEB-2001 11:17:52 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 1 Text: DB5 CPSM / M23 CS3 Vial# 3 File Text: AAP DB5
407.7818 F:4 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 322



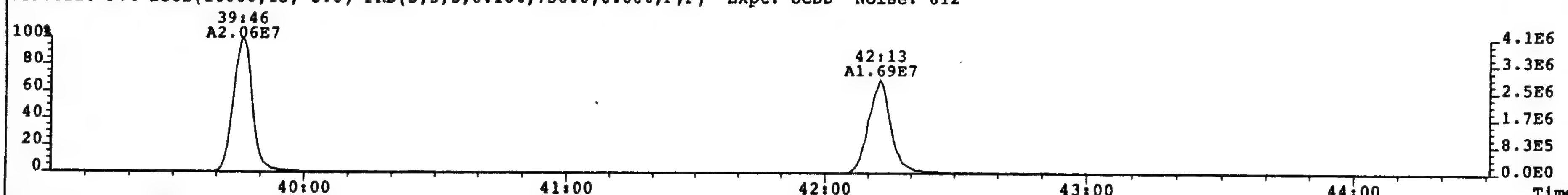
409.7788 F:4 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 402



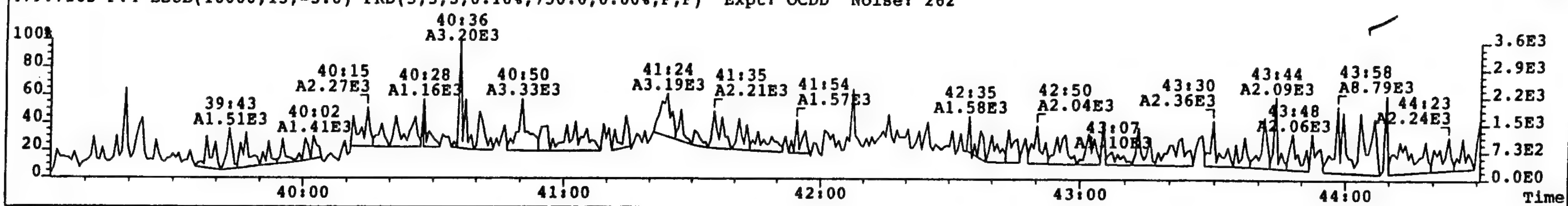
417.8253 F:4 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 555

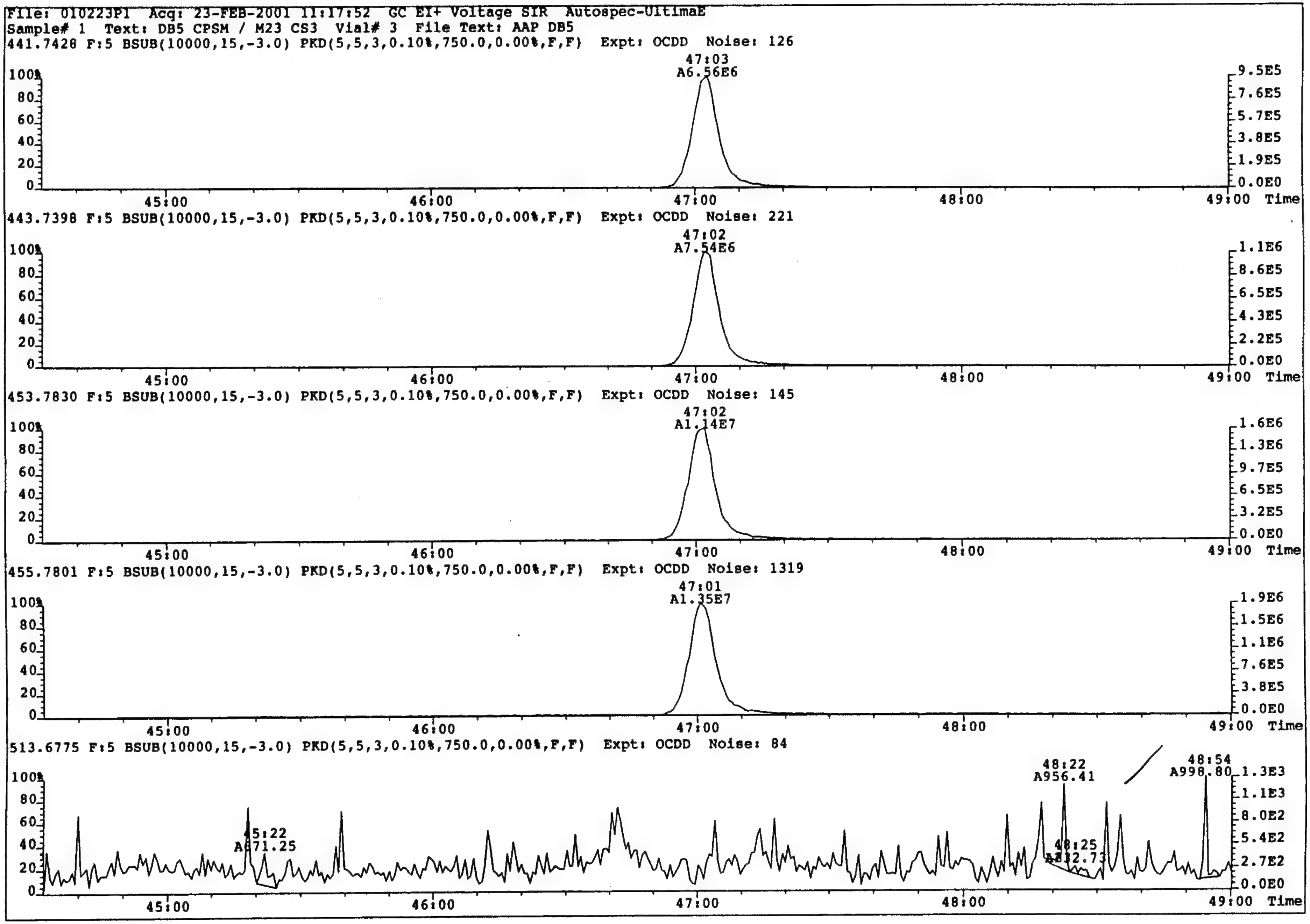


419.8220 F:4 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 812



479.7165 F:4 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 262




File: 010223P1 Acq: 23-FEB-2001 11:17:52 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 1 Text: DB5 CPSM / M23 CS3 Vial# 3 File Text: AAP DB5
441.7428 F:5 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 126
47:03
A6.56E6
443.7398 F:5 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 221
47:02
A7.54E6
453.7830 F:5 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 145
47:02
A1.14E7
455.7801 F:5 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 1319
47:01
A1.35E7
513.6775 F:5 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 84
45:22
A671.25
48:22
A956.41
48:25
A232.73
48:54
A998.80
45:00
46:00
47:00
48:00
49:00
Time

45

PCDD/PCDF CALIBRATION VERIFICATION

Alta Analytical Perspectives

Reviewer: Ce

Date: 24 Feb 01

Initial Calibration Date: 10/05/00

Instrument ID: MM-1 GC Column ID: DB-5

VER Data Filename: 010223P1 S#4 Analysis Date: 23-FEB-01 Time: 13:52:50

NATIVE ANALYTES	M/Z'S FORMING RATIO	ION ABUND. RATIO	QC LIMITS	Pass	CONC. FOUND	CONC. RANGE (ng/mL)
2,3,7,8-TCDD	M/M+2	0.77	0.65-0.89	y	5.72	3.75 - 6.25
1,2,3,7,8-PeCDD	M+2/M+4	1.56	1.32-1.78	y	27.30	18.75-31.25
1,2,3,4,7,8-HxCDD	M+2/M+4	1.25	1.05-1.43	y	25.77	18.75-31.25
1,2,3,6,7,8-HxCDD	M+2/M+4	1.26	1.05-1.43	y	26.57	18.75-31.25
1,2,3,7,8,9-HxCDD	M+2/M+4	1.24	1.05-1.43	y	26.94	18.75-31.25
1,2,3,4,6,7,8-HpCDD	M+2/M+4	1.03	0.88-1.20	y	25.31	18.75-31.25
OCDD	M+2/M+4	0.88	0.76-1.02	y	52.15	37 - 65
2,3,7,8-TCDF	M/M+2	0.74	0.65-0.89	y	4.75	3.75 - 6.25
1,2,3,7,8-PeCDF	M+2/M+4	1.54	1.32-1.78	y	25.15	18.75-31.25
2,3,4,7,8-PeCDF	M+2/M+4	1.52	1.32-1.78	y	25.03	18.75-31.25
1,2,3,4,7,8-HxCDF	M+2/M+4	1.23	1.05-1.43	y	24.69	18.75-31.25
1,2,3,6,7,8-HxCDF	M+2/M+4	1.22	1.05-1.43	y	24.52	18.75-31.25
2,3,4,6,7,8-HxCDF	M+2/M+4	1.22	1.05-1.43	y	24.09	18.75-31.25
1,2,3,7,8,9-HxCDF	M+2/M+4	1.22	1.05-1.43	y	24.33	18.75-31.25
1,2,3,4,6,7,8-HpCDF	M+2/M+4	1.02	0.88-1.20	y	24.26	18.75-31.25
1,2,3,4,7,8,9-HpCDF	M+2/M+4	1.02	0.88-1.20	y	23.32	18.75-31.25
OCDF	M+2/M+4	0.89	0.76-1.02	y	49.06	35 - 65

Analyst: GAG

Date: 23 Feb 01

PCDD/PCDF CALIBRATION VERIFICATION

Alta Analytical Perspectives

Reviewer: Cl

Date: 24 Feb 01

Initial Calibration Date: 10/05/00

Instrument ID: MM-1 GC Column ID: DB-5

VER Data Filename: 010223P1 S#4 Analysis Date: 23-FEB-01 Time: 13:52:50

LABELED COMPOUNDS	M/Z'S FORMING RATIO	ION ABUND. RATIO	QC LIMITS	Pass	CONC. FOUND	CONC. RANGE (ng/mL)
13C-2,3,7,8-TCDD	M/M+2	0.79	0.65-0.89	y	95.0	70.0 - 130.0
13C-1,2,3,7,8-PeCDD	M+2/M+4	1.56	1.32-1.78	y	103.9	70.0 - 130.0
13C-1,2,3,6,7,8-HxCDD	M+2/M+4	1.25	1.05-1.43	y	92.4	70.0 - 130.0
13C-1,2,3,4,6,7,8-HpCDD	M+2/M+4	1.05	0.88-1.20	y	90.4	70.0 - 130.0
13C-OCDD	M+2/M+4	0.89	0.76-1.02	y	86.6	70.0 - 130.0
13C-2,3,7,8-TCDF	M/M+2	0.79	0.65-0.89	y	93.0	70.0 - 130.0
13C-1,2,3,7,8-PeCDF	M+2/M+4	1.59	1.32-1.78	y	90.3	70.0 - 130.0
13C-1,2,3,6,7,8-HxCDF	M/M+2	0.52	0.43-0.59	y	87.7	70.0 - 130.0
13C-1,2,3,4,6,7,8-HpCDF	M/M+2	0.45	0.37-0.51	y	82.1	70.0 - 130.0
13C-OCDF	M+2/M+4	0.88	0.76-1.02	y	82.4	70.0 - 130.0
37Cl-2,3,7,8-TCDD					107.3	75.0 - 125.0
13C-2,3,4,7,8-PeCDF	M+2/M+4	1.56	1.32-1.78	y	104.8	75.0 - 125.0
13C-1,2,3,4,7,8-HxCDD	M+2/M+4	1.26	1.05-1.43	y	102.4	75.0 - 125.0
13C-1,2,3,4,7,8-HxCDF	M/M+2	0.52	0.43-0.59	y	105.0	75.0 - 125.0
13C-1,2,3,4,7,8,9-HpCDF	M/M+2	0.44	0.37-0.51	y	100.7	75.0 - 125.0
13C-1,2,3,7,8,9-HxCDF	M/M+2	0.52	0.43-0.59	y	90.8	75.0 - 125.0

Analyst: GAG

Date: 24 Feb 01

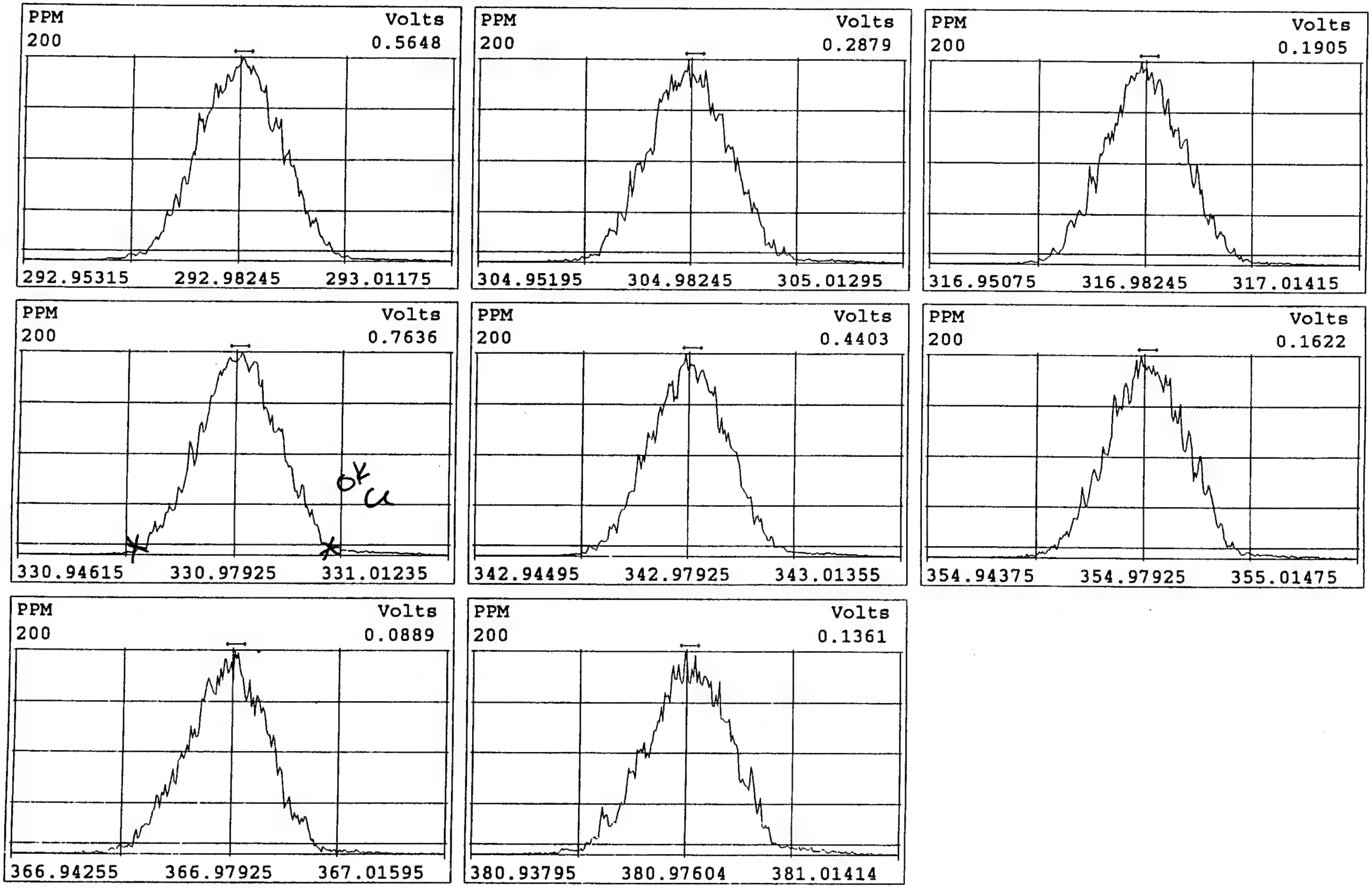
Client ID: DB5 CPSM / M23 CS3 Filename: 010223P1 S: 4 Acq: 23-FEB-01 13:52:50 ConCal: 010223P1-
Lab ID: CS3RC GC Column ID: db-5 ICal: MM1_M23_0: wt/vol: 1.000 EndCal: 010223P1-

	Name	Resp	RA		RRF	RT	Conc	Qualif.	CDE	noise	Fac	DL	EMPC / Rec
	2,3,7,8-TCDD	4.69e+06	0.77	y	1.26	27:38	5.72			858	2.5	0.0191	
	1,2,3,7,8-PeCDD	1.60e+07	1.56	y	1.01	33:06	27.3			311763	2.5	12.4	
	1,2,3,4,7,8-HxCDD	1.43e+07	1.25	y	1.14	37:00	25.8			2428	2.5	0.101	
	1,2,3,6,7,8-HxCDD	1.32e+07	1.26	y	1.02	37:07	26.6			2428	2.5	0.112	
	1,2,3,7,8,9-HxCDD	1.50e+07	1.24	y	1.14	37:26	26.9			2428	2.5	0.101	
	1,2,3,4,6,7,8-HpCDD	1.32e+07	1.03	y	1.13	41:23	25.3			2494	2.5	0.157	
	OCDD	1.92e+07	0.88	y	1.03	46:41	52.1			850	2.5	0.0960	
	2,3,7,8-TCDF	4.36e+06	0.74	y	1.05	26:44	4.75			1265	2.5	0.0266	
	1,2,3,7,8-PeCDF	2.01e+07	1.54	y	1.04	31:37	25.2			8276	2.5	0.252	
	2,3,4,7,8-PeCDF	2.03e+07	1.52	y	1.05	32:44	25.0			8276	2.5	0.248	
	1,2,3,4,7,8-HxCDF	1.77e+07	1.23	y	1.13	36:01	24.7			3215	2.5	0.0651	
	1,2,3,6,7,8-HxCDF	1.92e+07	1.22	y	1.24	36:10	24.5			3215	2.5	0.0595	
	2,3,4,6,7,8-HxCDF	1.78e+07	1.22	y	1.16	36:49	24.1			3215	2.5	0.0633	
	1,2,3,7,8,9-HxCDF	1.57e+07	1.22	y	1.02	37:49	24.3			3215	2.5	0.0724	
	1,2,3,4,6,7,8-HpCDF	1.56e+07	1.02	y	1.54	39:46	24.3			3299	2.5	0.101	
	1,2,3,4,7,8,9-HpCDF	1.27e+07	1.02	y	1.30	42:12	23.3			3299	2.5	0.120	
	OCDF	2.12e+07	0.89	y	1.15	47:01	49.1			1780	2.5	0.160	
													EMPC
	Total Tetra-Dioxins	1.86e+07	0.77	y	1.26	23:52	22.6			858	2.5	0.0191	22.8
	Total Penta-Dioxins	4.20e+07	1.56	y	1.01	30:33	71.5			311763	2.5	12.4	71.5
	Total Hexa-Dioxins	4.40e+07	1.24	y	1.10	35:18	82.2			2428	2.5	0.104	82.7
	Total Hepta-Dioxins	2.44e+07	1.03	y	1.13	40:12	46.8			2494	2.5	0.157	47.0
	Total Tetra-Furans	1.10e+07	0.72	y	1.05	21:10	12.0			1265	2.5	0.0266	12.3
	1st Fnc. Penta-Furans	1.65e+07	1.62	y	1.05	28:44	20.5			4541	2.5	0.137	20.5
	Total Penta-Furans	5.74e+07	1.54	y	1.05	31:37	71.4			8276	2.5	0.250	
	PeCDF Totals:						91.9						92.2
	Total Hexa-Furans	7.24e+07	1.26	y	1.14	34:38	100			3215	2.5	0.0647	101
	Total Hepta-Furans	2.83e+07	1.02	y	1.42	39:46	47.6			3299	2.5	0.109	48.2
													Rec
IS	13C-2,3,7,8-TCDD	6.50e+07	0.79	y	1.13	27:36	95.0						95.0
IS	13C-1,2,3,7,8-PeCDD	5.80e+07	1.56	y	0.93	33:04	104						104
IS	13C-1,2,3,6,7,8-HxCDD	4.86e+07	1.25	y	0.93	37:06	92.4						92.4
IS	13C-1,2,3,4,6,7,8-HpCDD	4.61e+07	1.05	y	0.91	41:22	90.4						90.4
IS	13C-OCDD	3.58e+07	0.89	y	0.73	46:40	86.6						86.6
IS	13C-2,3,7,8-TCDF	8.76e+07	0.79	y	1.06	26:43	93.0						93.0
IS	13C-1,2,3,7,8-PeCDF	7.68e+07	1.59	y	0.96	31:36	90.3						90.3
IS	13C-1,2,3,6,7,8-HxCDF	6.34e+07	0.52	y	1.28	36:09	87.7						87.7
IS	13C-1,2,3,4,6,7,8-HpCDF	4.18e+07	0.45	y	0.90	39:45	82.1						82.1
IS	13C-OCDF	3.77e+07	0.88	y	0.81	47:00	82.4						82.4
RS/RT	13C-1,2,3,4-TCDD	6.03e+07	0.82	y	1.00	26:56	100						-
RS	13C-1,2,3,4-TCDF	8.88e+07	0.77	y	1.00	25:19	100						-
RS/RT	13C-1,2,3,7,8,9-HxCDD	5.64e+07	1.27	y	1.00	37:25	100						-
PS	37Cl-2,3,7,8-TCDD	3.59e+07			0.51	27:38	107						107
PS	13C-2,3,4,7,8-PeCDF	7.84e+07	1.56	y	0.97	32:43	105						105
PS	13C-1,2,3,4,7,8-HxCDD	4.59e+07	1.26	y	0.92	36:59	102						102
PS	13C-1,2,3,4,7,8-HxCDF	6.05e+07	0.52	y	0.91	36:00	105						105
PS	13C-1,2,3,4,7,8,9-HpCDF	3.59e+07	0.44	y	0.85	42:11	101						101
AS	13C-1,2,3,7,8,9-HxCDF	5.47e+07	0.52	y	1.07	37:49	90.8						90.8

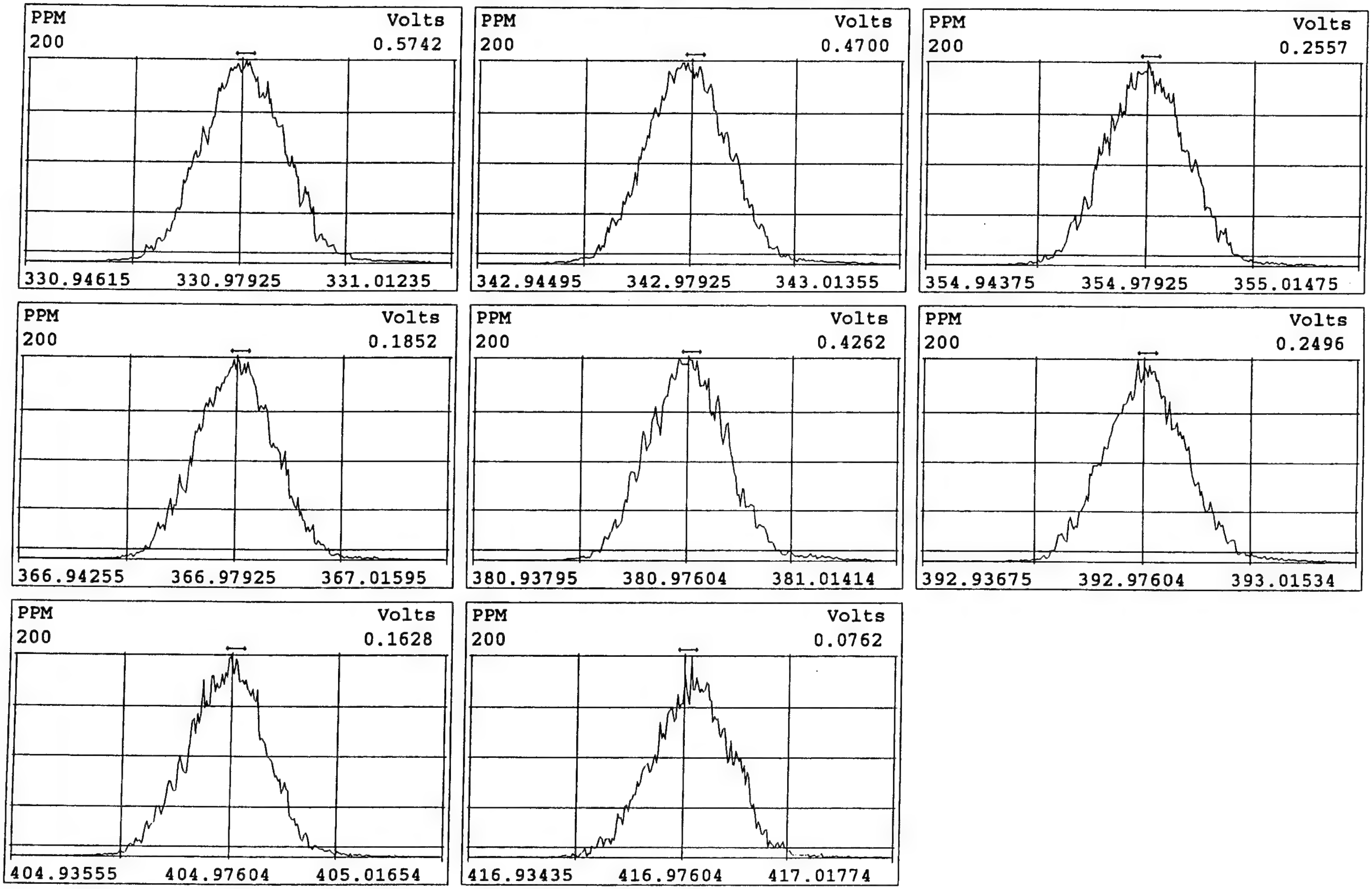
Reviewer: ce
Date: 24 Feb 01

Analyst: SAG
Date: 24Feb01

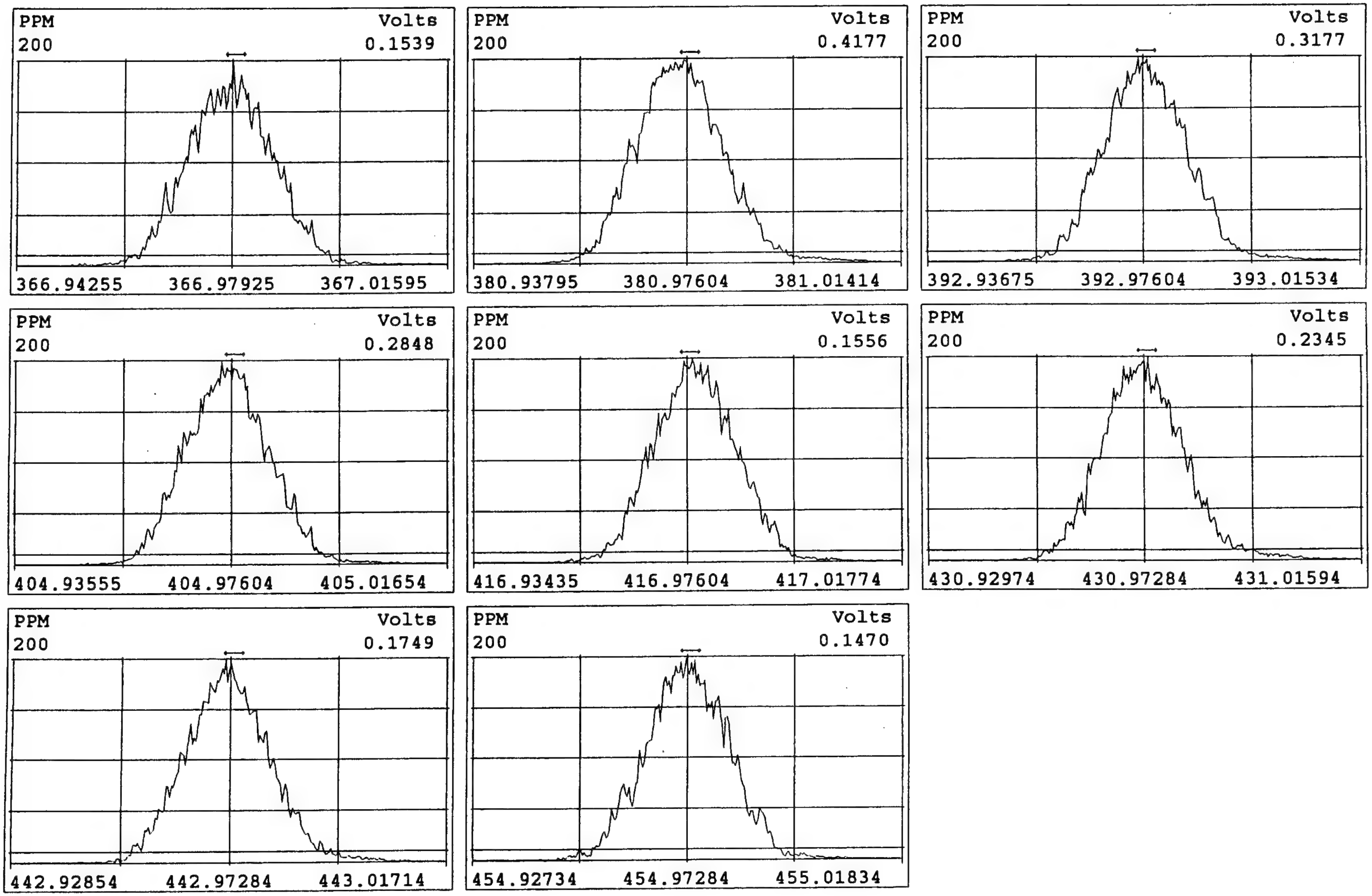
Peak Locate Examination:23-FEB-2001:14:59 File:RES_CHECK
Experiment:OCDD Function:1 Reference:PFK2



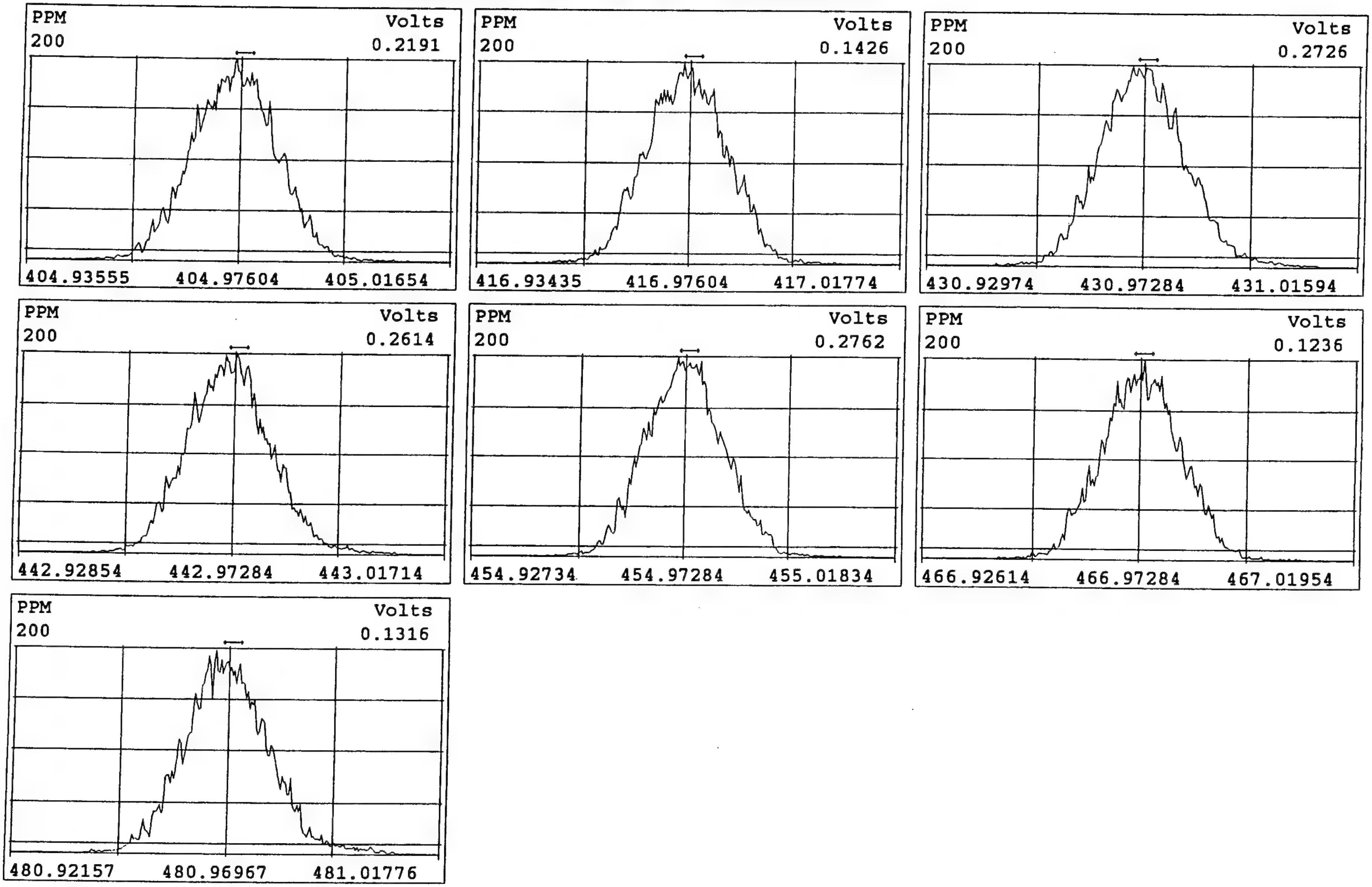
Peak Locate Examination:23-FEB-2001:15:00 File:RES_CHECK
Experiment:OCDD Function:2 Reference:PFK2



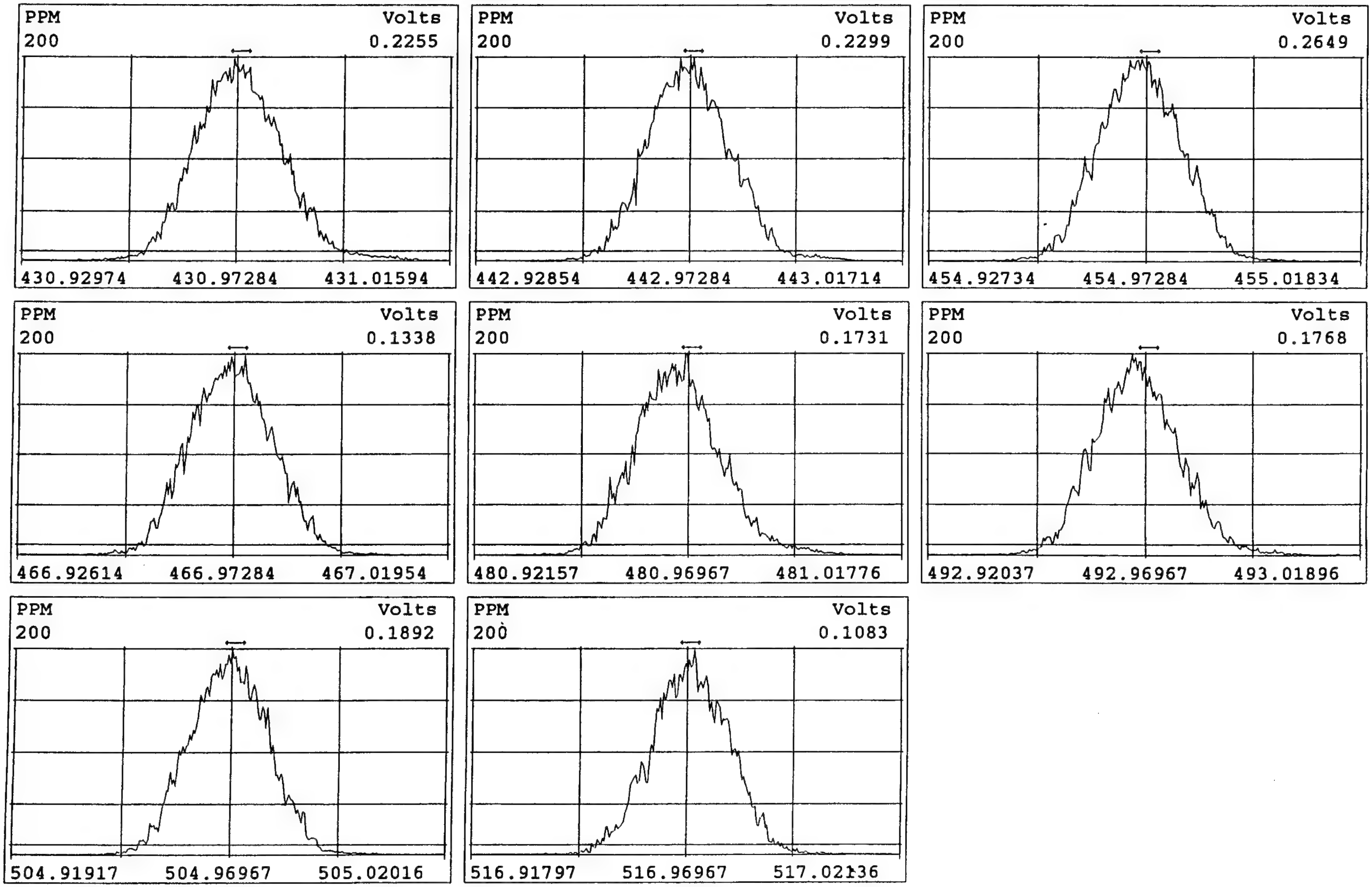
Peak Locate Examination:23-FEB-2001:15:00 File:RES_CHECK
Experiment:OCDD Function:3 Reference:PFK2

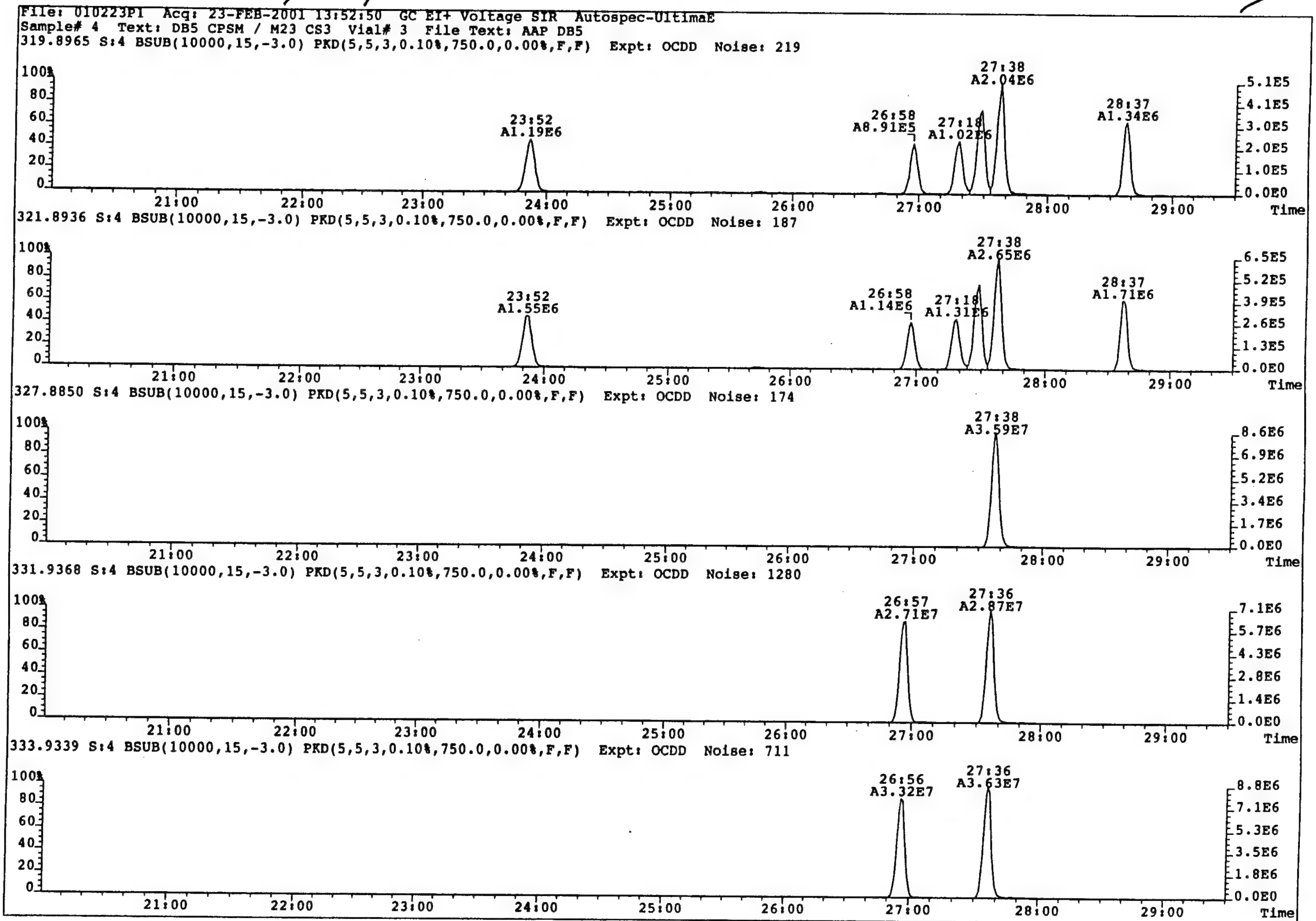


Peak Locate Examination:23-FEB-2001:15:00 File:RES_CHECK
Experiment:OCDD Function:4 Reference:PFK2



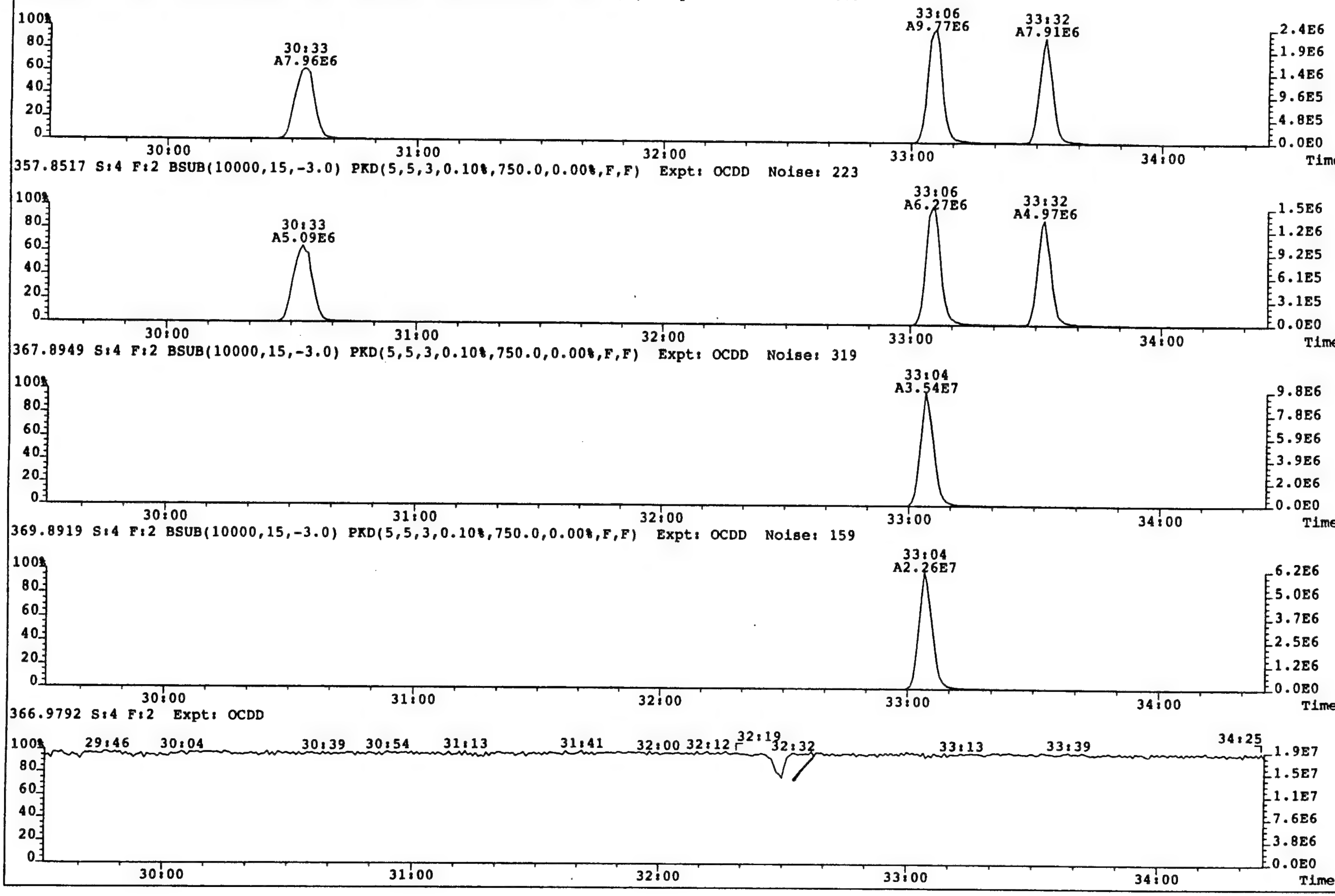
Peak Locate Examination:23-FEB-2001:15:01 File:RES_CHECK
Experiment:OCDD Function:5 Reference:PFK2

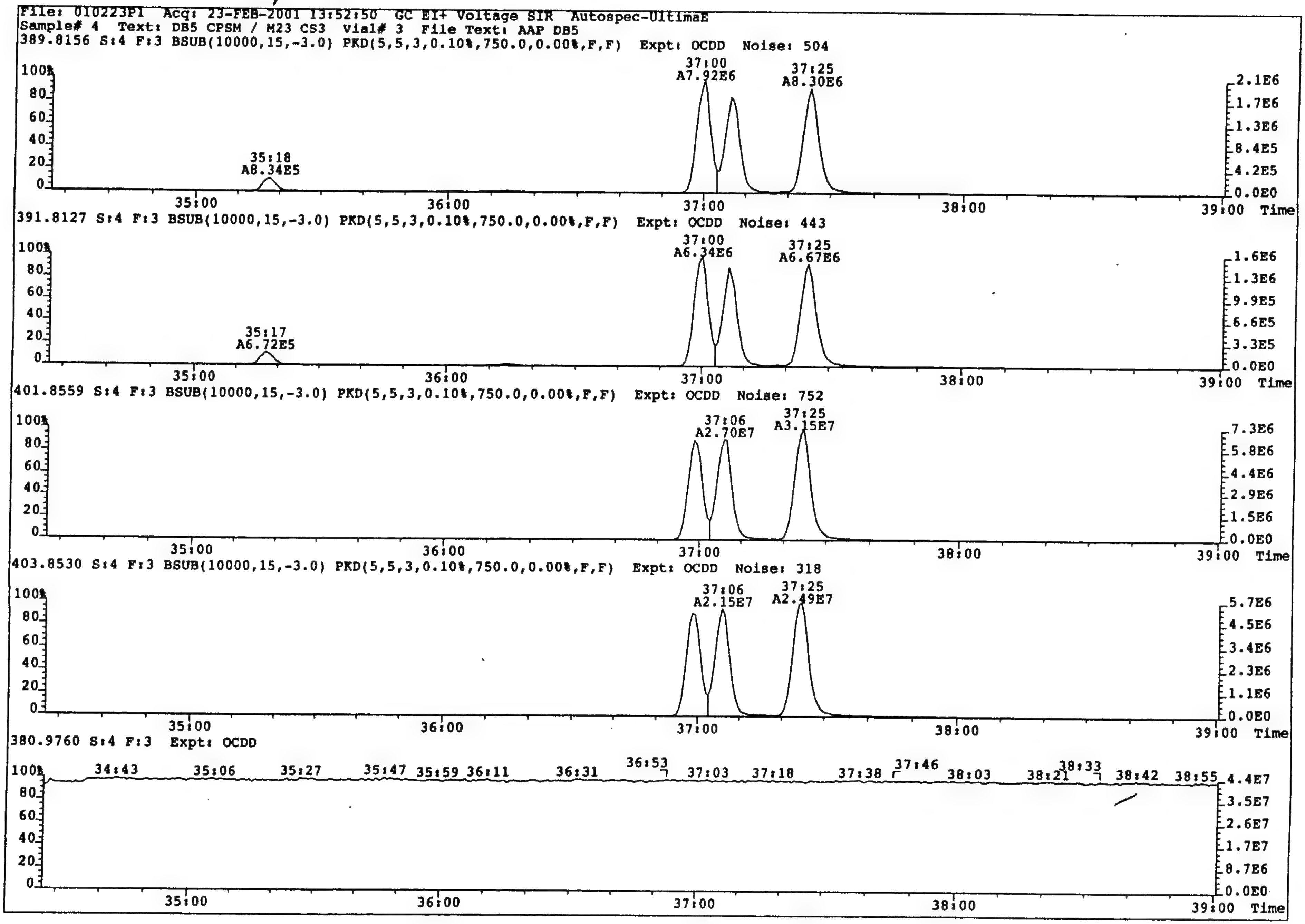




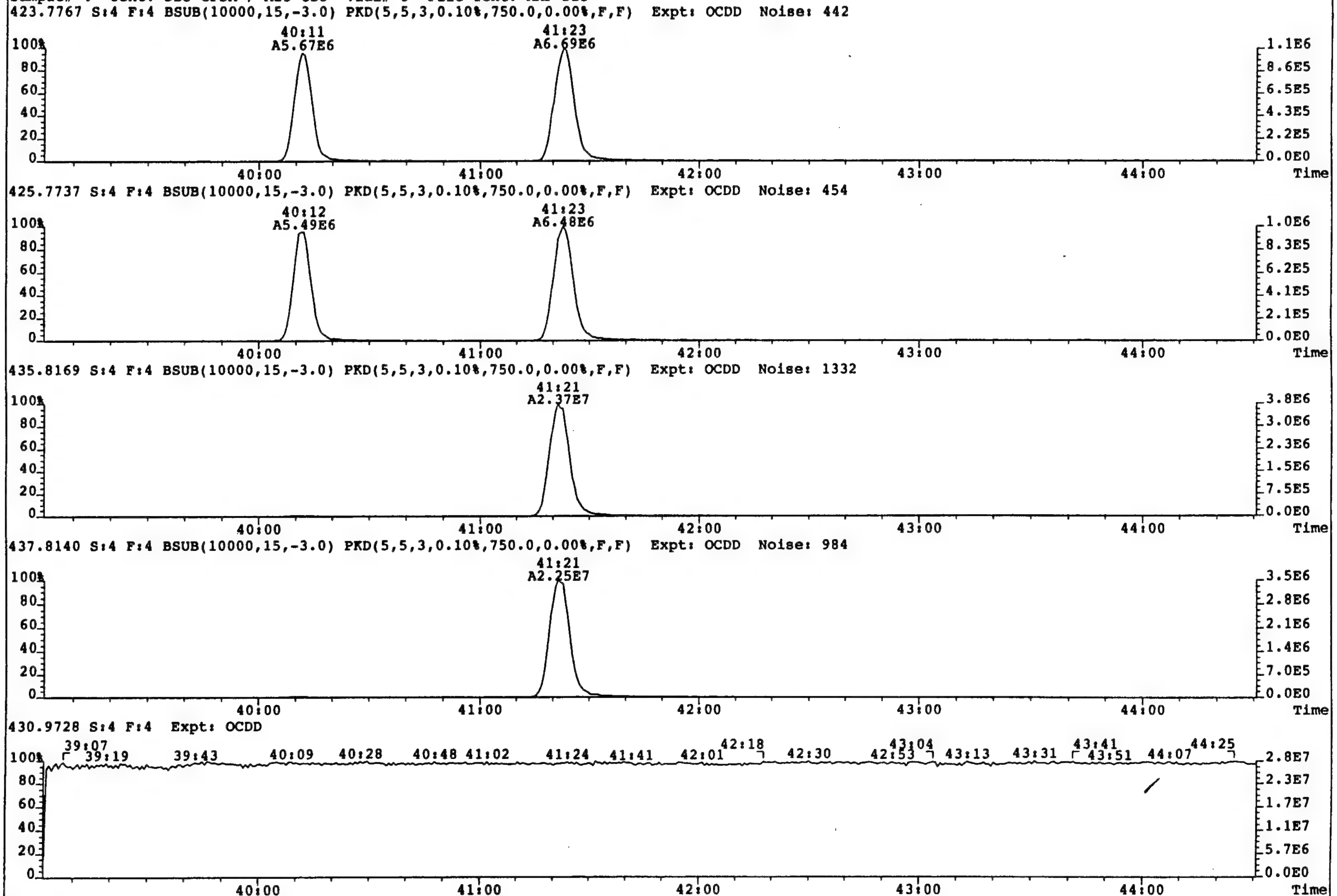
File: 010223P1 Acq: 23-FEB-2001 13:52:50 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 4 Text: DB5 CPSM / M23 CS3 Vial# 3 File Text: AAP DB5
319.8965 S:4 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 219
23:52 A1.19E6
26:58 A8.91E5
27:18 A1.02E6
27:38 A2.04E6
28:37 A1.34E6
321.8936 S:4 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 187
23:52 A1.55E6
26:58 A1.14E6
27:18 A1.31E6
27:38 A2.65E6
28:37 A1.71E6
327.8850 S:4 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 174
27:38 A3.59E7
331.9368 S:4 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 1280
26:57 A2.71E7
27:36 A2.87E7
333.9339 S:4 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 711
26:56 A3.32E7
27:36 A3.63E7
Time

File: 010223P1 Acq: 23-FEB-2001 13:52:50 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 4 Text: DB5 CPSM / M23 CS3 Vial# 3 File Text: AAP DB5
355.8546 S:4 F:2 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 579

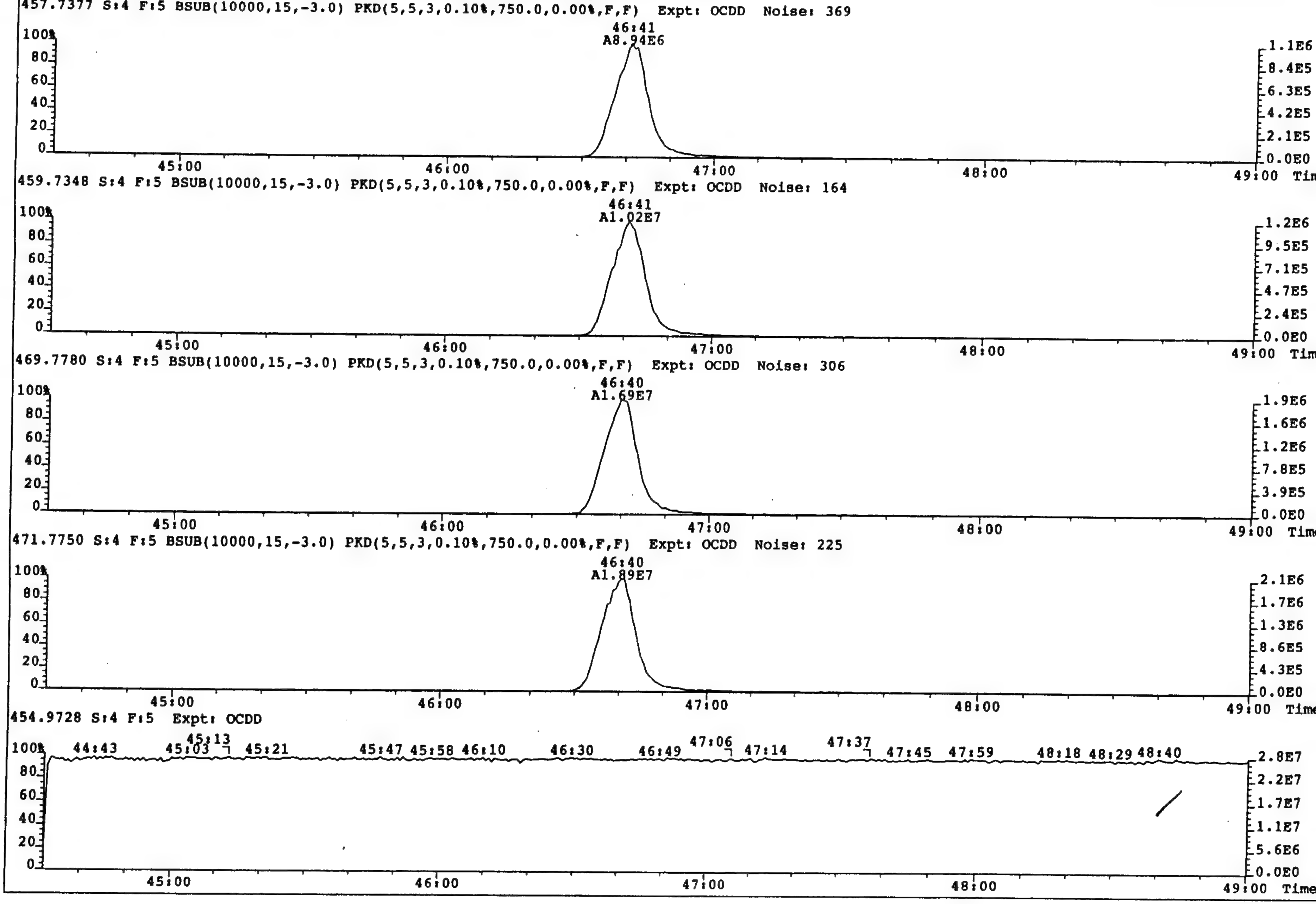



File: 010223P1 Acq: 23-FEB-2001 13:52:50 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 4 Text: DB5 CPSM / M23 CS3 Vial# 3 File Text: AAP DB5
389.8156 S:4 F:3 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 504
100%
80
60
40
20
0
35:18
A8.34E5
37:00
A7.92E6
37:25
A8.30E6
2.1E6
1.7E6
1.3E6
8.4E5
4.2E5
0.0E0
35:00
36:00
37:00
38:00
39:00 Time
391.8127 S:4 F:3 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 443
35:17
A6.72E5
37:00
A6.34E6
37:25
A6.67E6
1.6E6
1.3E6
9.9E5
6.6E5
3.3E5
0.0E0
401.8559 S:4 F:3 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 752
37:06
A2.70E7
37:25
A3.15E7
7.3E6
5.8E6
4.4E6
2.9E6
1.5E6
0.0E0
403.8530 S:4 F:3 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 318
37:06
A2.15E7
37:25
A2.49E7
5.7E6
4.5E6
3.4E6
2.3E6
1.1E6
0.0E0
380.9760 S:4 F:3 Expt: OCDD
34:43 35:06 35:27 35:47 35:59 36:11 36:31 36:53 37:03 37:18 37:38 37:46 38:03 38:21 38:33 38:42 38:55
4.4E7
3.5E7
2.6E7
1.7E7
8.7E6
0.0E0

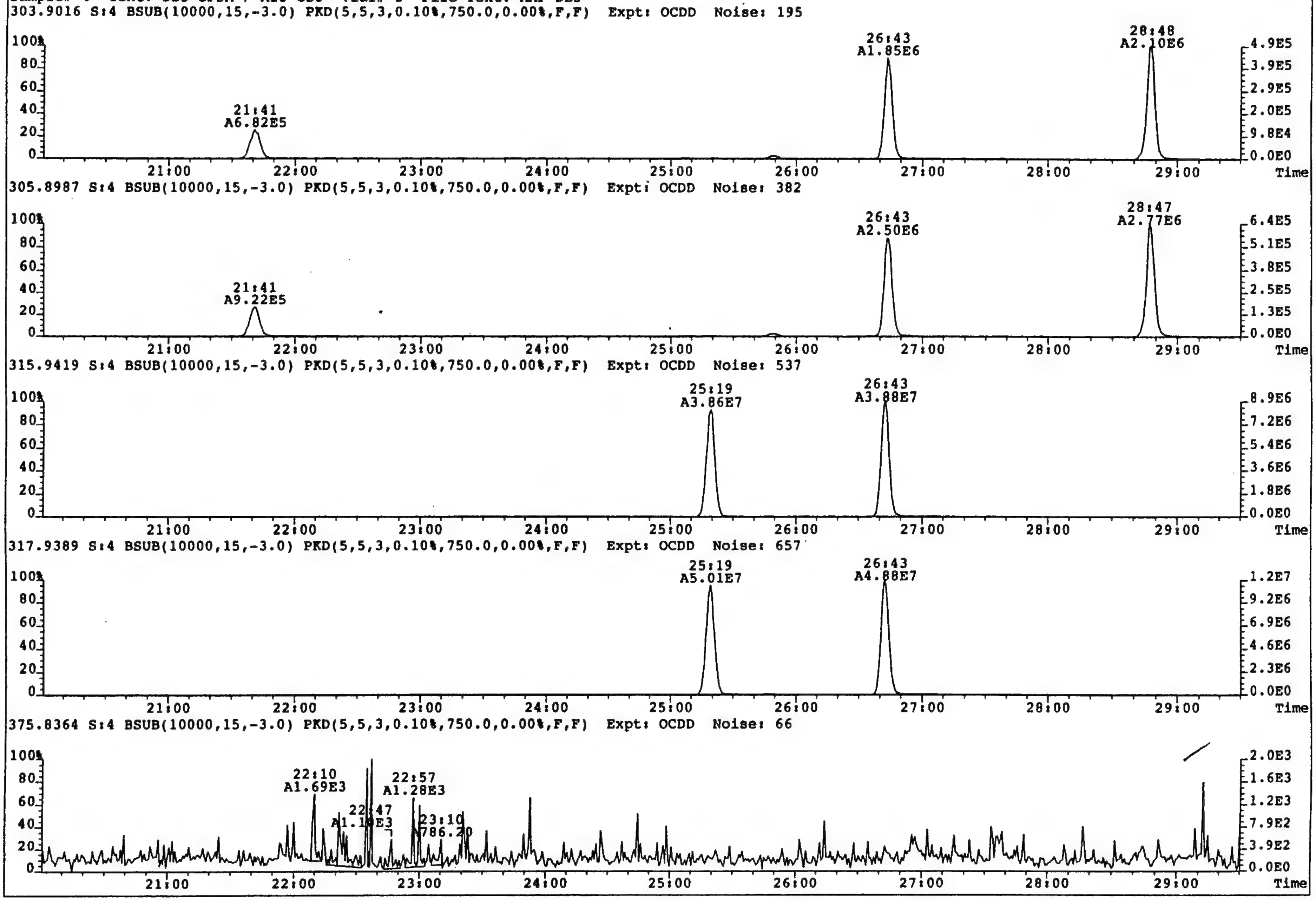
File: 010223P1 Acq: 23-FEB-2001 13:52:50 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 4 Text: DB5 CPSM / M23 CS3 Vial# 3 File Text: AAP DB5



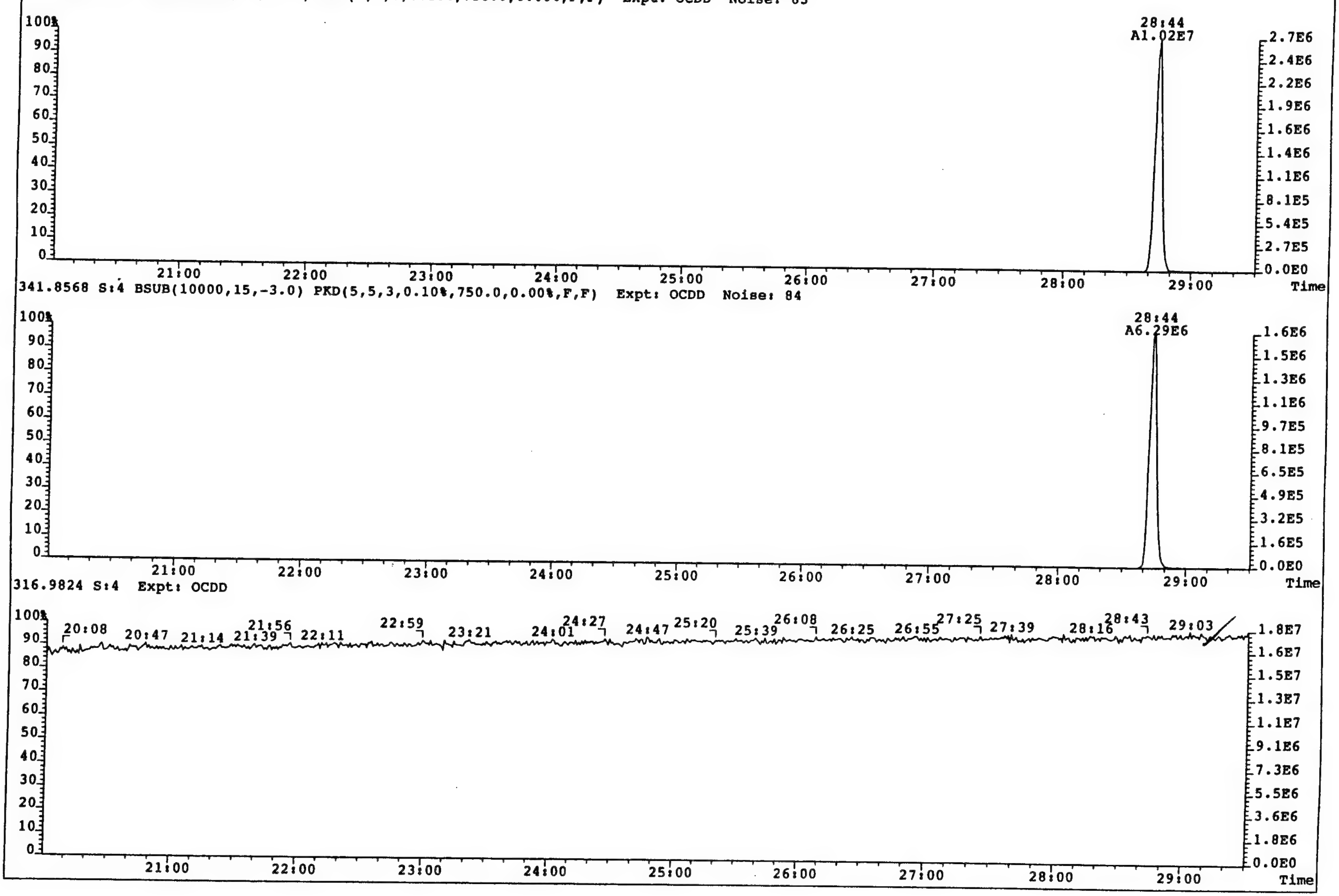
File: 010223P1 Acq: 23-FEB-2001 13:52:50 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 4 Text: DB5 CPSM / M23 CS3 Vial# 3 File Text: AAP DB5



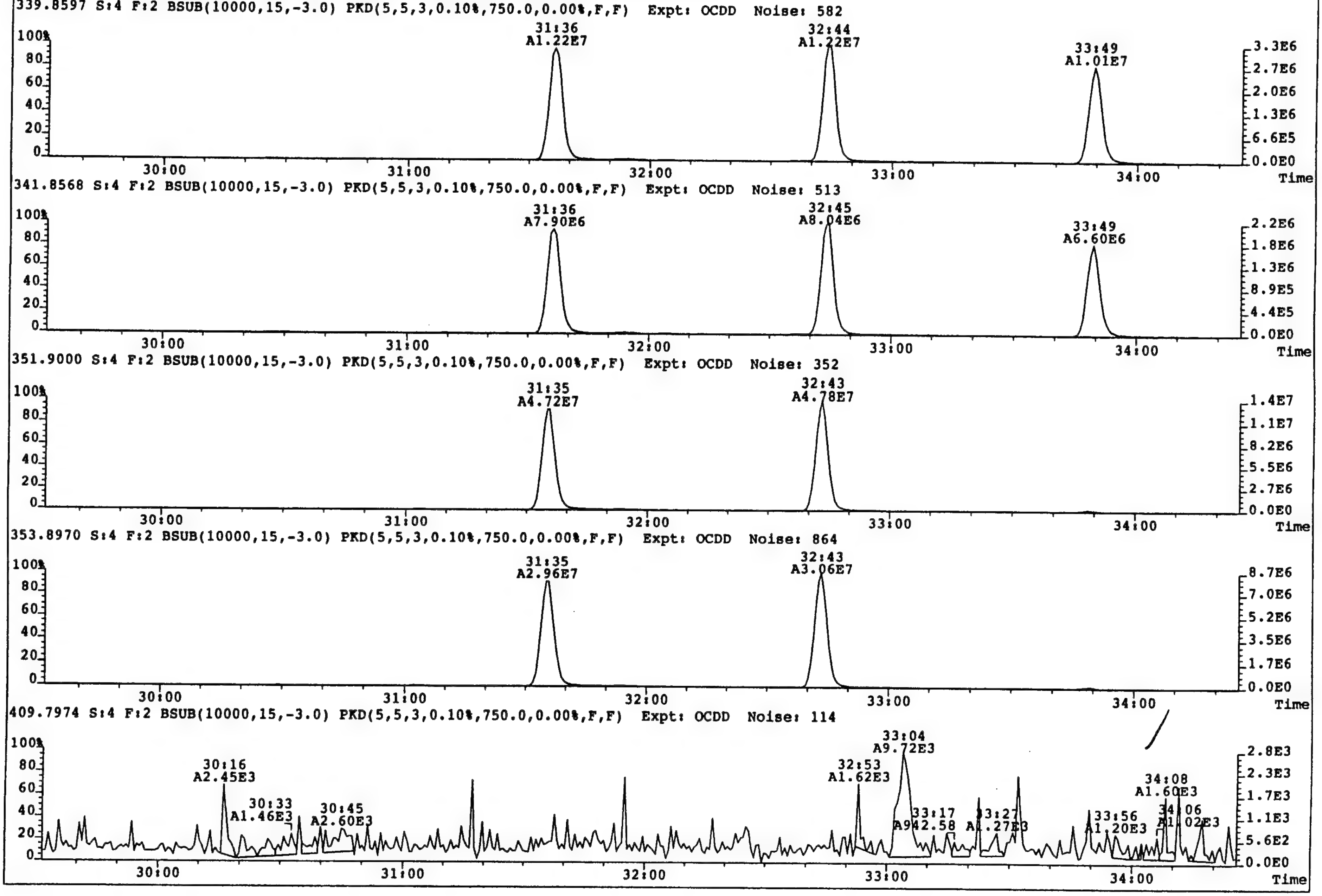
File: 010223P1 Acq: 23-FEB-2001 13:52:50 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 4 Text: DB5 CPSM / M23 CS3 Vial# 3 File Text: AAP DB5

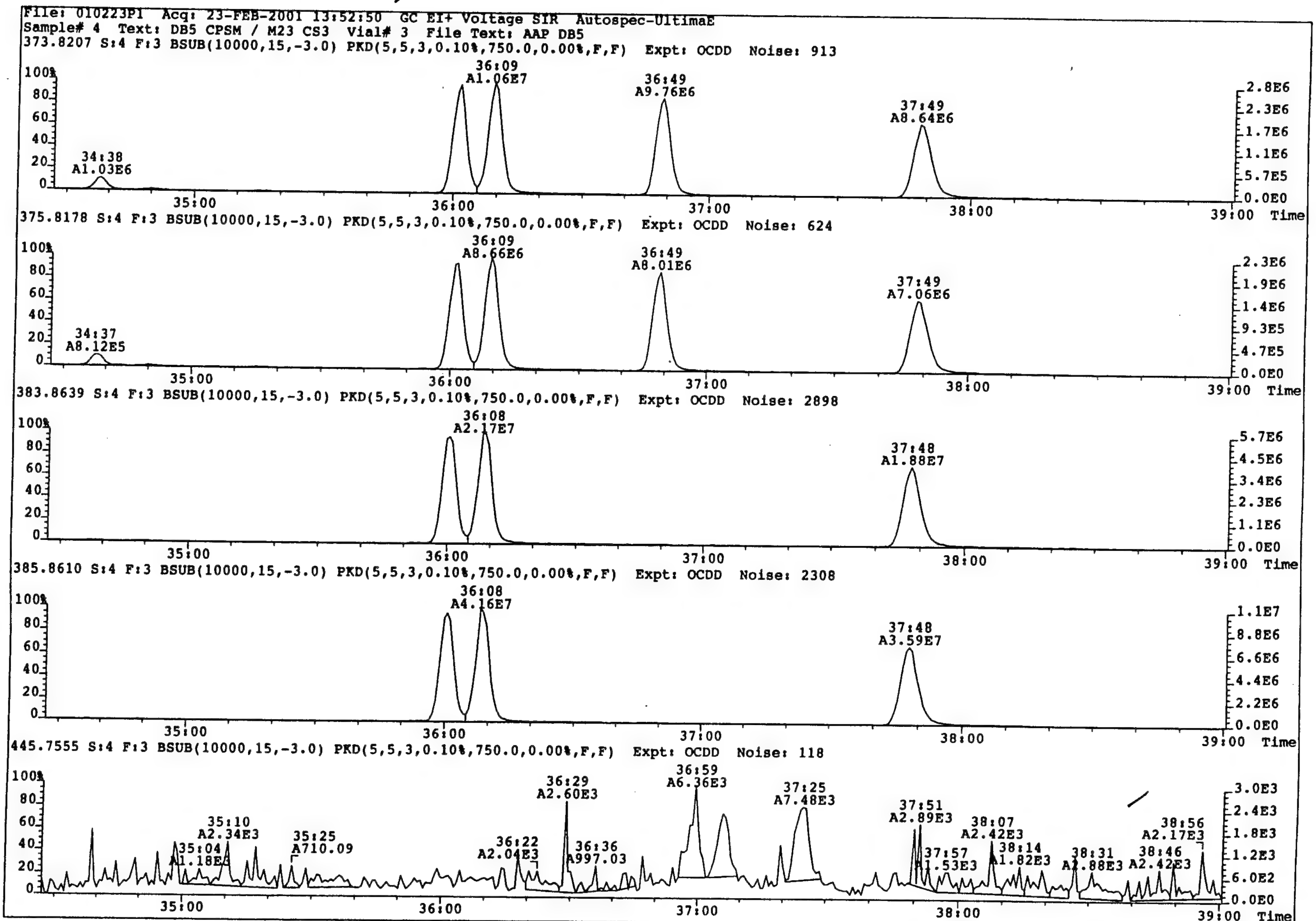


File: 010223P1 Acq: 23-FEB-2001 13:52:50 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 4 Text: DB5 CPSM / M23 CS3 Vial# 3 File Text: AAP DB5

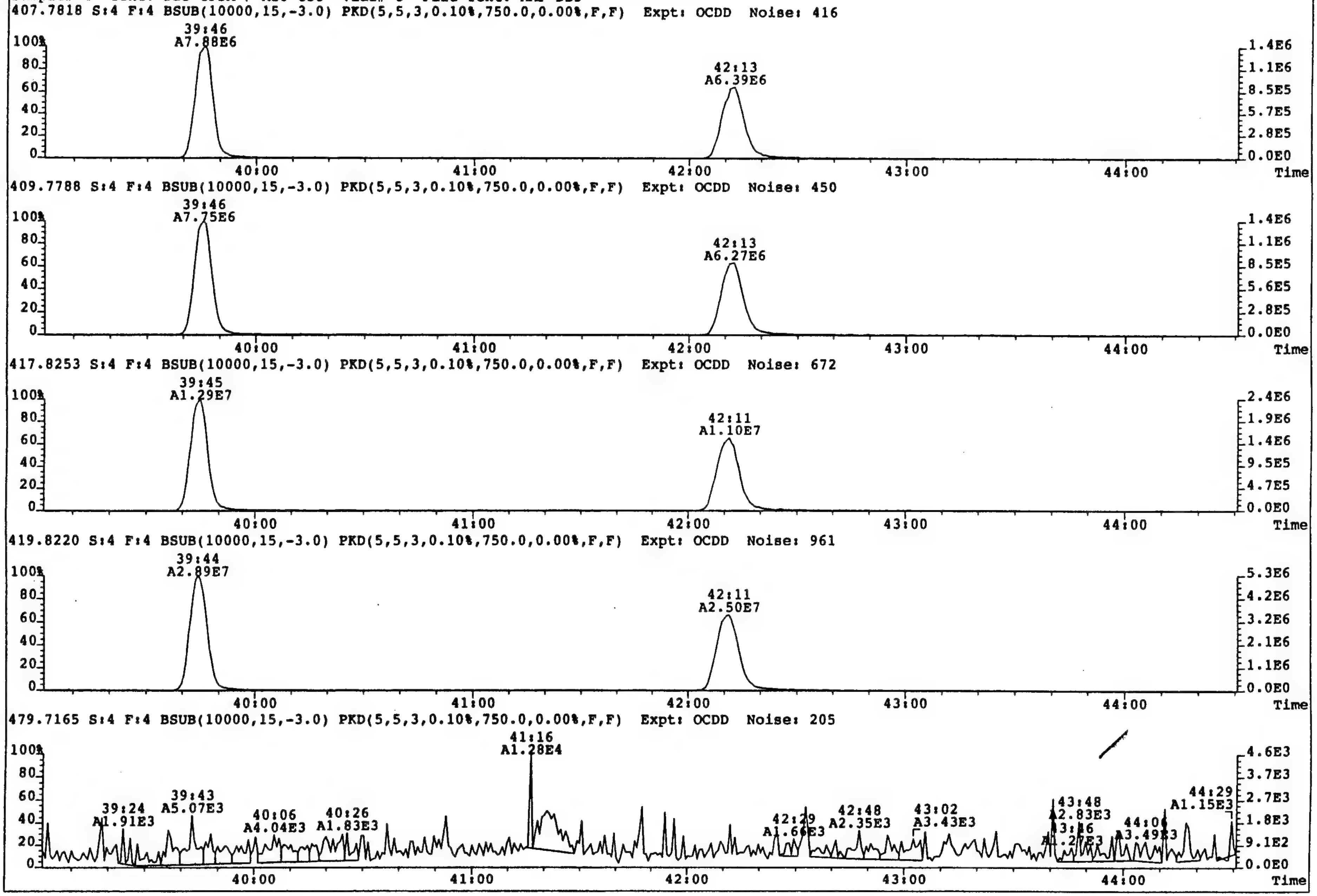


File: 010223P1 Acq: 23-FEB-2001 13:52:50 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 4 Text: DB5 CPSM / M23 CS3 Vial# 3 File Text: AAP DB5

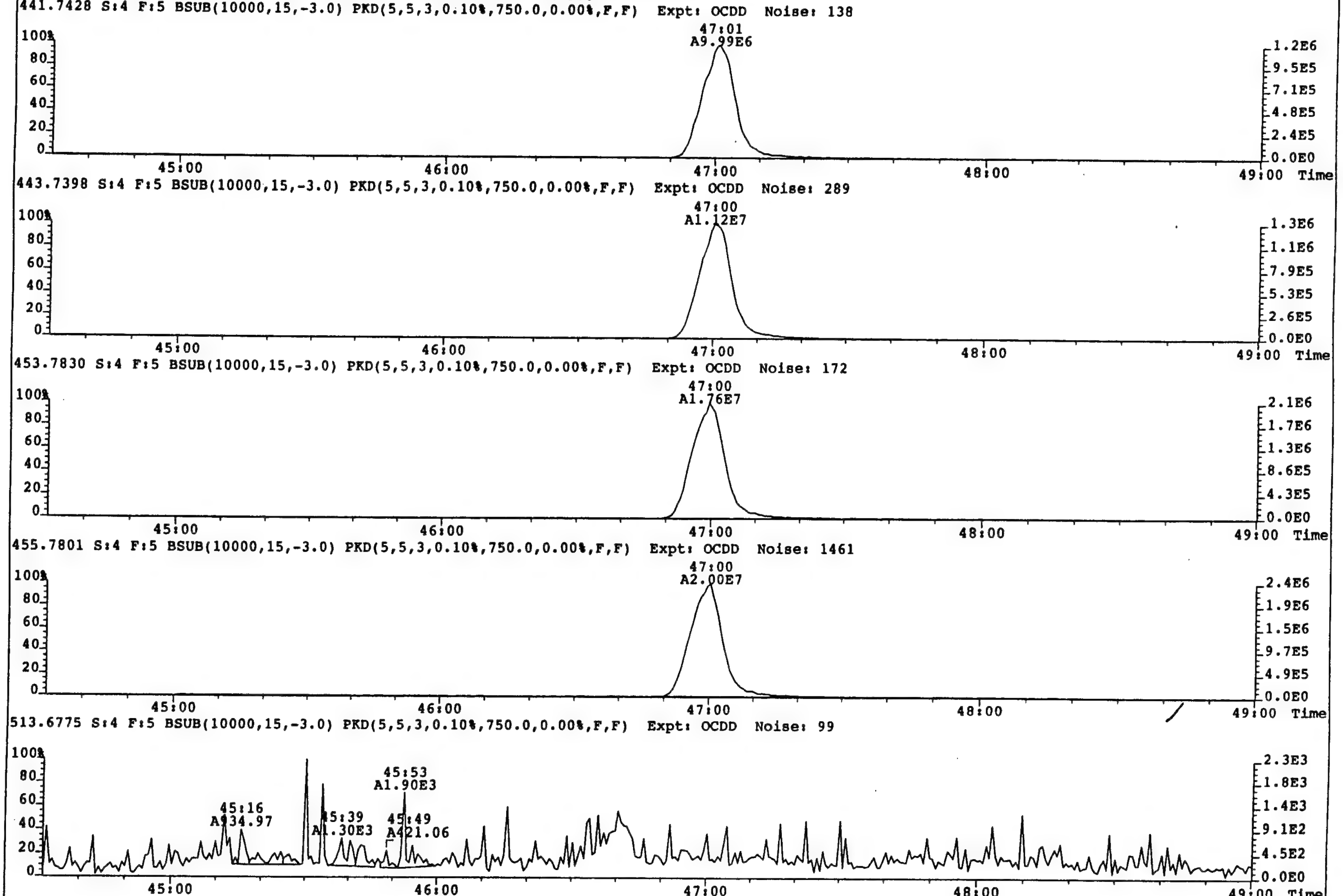



File: 010223P1 Acq: 23-FEB-2001 13:52:50 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 4 Text: DB5 CPSM / M23 CS3 Vial# 3 File Text: AAP DB5
373.8207 S:4 F:3 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 913
34:38 A1.03E6
36:09 A1.06E7
36:49 A9.76E6
37:49 A8.64E6
375.8178 S:4 F:3 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 624
34:37 A8.12E5
36:09 A8.66E6
36:49 A8.01E6
37:49 A7.06E6
383.8639 S:4 F:3 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 2898
36:08 A2.17E7
37:48 A1.88E7
385.8610 S:4 F:3 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 2308
36:08 A4.16E7
37:48 A3.59E7
445.7555 S:4 F:3 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 118
35:04 A1.18E3
35:10 A2.34E3
35:25 A710.09
36:22 A2.04E3
36:29 A2.60E3
36:36 A997.03
36:59 A6.36E3
37:25 A7.48E3
37:51 A2.89E3
37:57 A1.53E3
38:07 A2.42E3
38:14 A1.82E3
38:31 A2.88E3
38:46 A2.42E3
38:56 A2.17E3
35:00
36:00
37:00
38:00
39:00 Time

File: 010223P1 Acq: 23-FEB-2001 13:52:50 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 4 Text: DB5 CPSM / M23 CS3 Vial# 3 File Text: AAP DB5



File: 010223P1 Acq: 23-FEB-2001 13:52:50 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 4 Text: DB5 CPSM / M23 CS3 Vial# 3 File Text: AAP DB5



Alta Analytical Perspectives

Part 4D

System Performance

"Initial Calibration"

Documentation for the Analysis

of

Polychlorinated Dibenzo-*p*-Dioxins & Dibenzofurans

Initial Calibration RRF Summary (ICAL) Alta Analytical Perspectives

Run: 001005P1 Analyte: m23mm1_cal Cal: mm1_m23_000919 Inst. ID. MM-1

Data filename: 001005P1

Name	Mean RRF	%RSD	Samp# 3 0.25 RRF#1	Samp# 4 0.50 RRF#2	Samp# 5 1.0 RRF#3	Samp# 6 5.0 RRF#4	Samp# 7 50 RRF#5	Samp# 8 100 RRF#6	Samp# 9 500 RRF#7
2,3,7,8-TCDD	1.26	2.04 %	1.30	1.21	1.25	1.27	1.27	1.27	1.26
1,2,3,7,8-PeCDD	1.01	5.08 %	0.98	0.93	0.99	1.06	1.06	1.01	1.06
1,2,3,4,7,8-HxCDD	1.14	5.15 %	1.08	1.08	1.12	1.19	1.21	1.10	1.20
1,2,3,6,7,8-HxCDD	1.02	4.04 %	1.04	0.97	1.03	1.07	1.07	0.97	1.01
1,2,3,7,8,9-HxCDD	1.14	4.26 %	1.11	1.10	1.12	1.21	1.20	1.09	1.16
1,2,3,4,6,7,8-HpCDD	1.13	5.87 %	1.10	1.05	1.07	1.17	1.19	1.10	1.22
OCDD	1.03	5.02 %	1.00	0.95	0.99	1.08	1.08	1.08	1.01
2,3,7,8-TCDF	1.05	7.26 %	1.01	0.97	0.98	1.04	1.06	1.19	1.08
1,2,3,7,8-PeCDF	1.04	4.06 %	1.02	0.98	1.01	1.09	1.09	1.01	1.06
2,3,4,7,8-PeCDF	1.05	4.68 %	1.01	1.01	1.03	1.12	1.12	1.02	1.08
1,2,3,4,7,8-HxCDF	1.13	5.67 %	1.11	1.05	1.13	1.20	1.20	1.05	1.17
1,2,3,6,7,8-HxCDF	1.24	4.10 %	1.21	1.20	1.23	1.29	1.29	1.16	1.28
2,3,4,6,7,8-HxCDF	1.16	5.47 %	1.16	1.11	1.15	1.24	1.25	1.08	1.17
1,2,3,7,8,9-HxCDF	1.02	5.76 %	0.97	0.97	1.01	1.09	1.10	0.96	1.04
1,2,3,4,6,7,8-HpCDF	1.54	4.77 %	1.49	1.45	1.51	1.63	1.63	1.50	1.58
1,2,3,4,7,8,9-HpCDF	1.30	6.39 %	1.24	1.19	1.27	1.39	1.39	1.23	1.38
OCDF	1.15	4.37 %	1.15	1.05	1.13	1.19	1.19	1.19	1.14
13C-2,3,7,8-TCDD	1.13	3.53 %	1.12	1.13	1.12	1.07	1.19	1.18	1.13
13C-1,2,3,7,8-PeCDD	0.93	6.05 %	0.90	0.90	0.88	0.86	0.96	0.99	1.00
13C-1,2,3,6,7,8-HxCDD	0.93	2.49 %	0.95	0.94	0.93	0.89	0.95	0.95	0.92
13C-1,2,3,4,6,7,8-HpCDD	0.91	4.58 %	0.96	0.88	0.94	0.86	0.93	0.91	0.85
13C-OCDD	0.73	4.88 %	0.77	0.71	0.75	0.68	0.74	0.71	0.77
13C-2,3,7,8-TCDF	1.06	3.69 %	1.05	1.11	1.04	1.01	1.08	1.11	1.03
13C-1,2,3,7,8-PeCDF	0.96	6.91 %	0.90	0.97	0.89	0.91	0.96	1.08	1.00
13C-1,2,3,6,7,8-HxCDF	1.28	3.33 %	1.31	1.31	1.28	1.21	1.30	1.33	1.24
13C-1,2,3,4,6,7,8-HpCDF	0.90	4.81 %	0.96	0.90	0.94	0.85	0.92	0.90	0.85
13C-OCDF	0.81	4.90 %	0.84	0.78	0.83	0.74	0.83	0.81	0.85
13C-1,2,3,4-TCDD	1.00	0.00 %	1.00	1.00	1.00	1.00	1.00	1.00	1.00
13C-1,2,3,4-TCDF	1.00	0.00 %	1.00	1.00	1.00	1.00	1.00	1.00	1.00
13C-1,2,3,7,8,9-HxCDD	1.00	0.00 %	1.00	1.00	1.00	1.00	1.00	1.00	1.00
37Cl-2,3,7,8-TCDD	0.51	1.94 %	0.50	0.51	0.51	0.52	0.50	0.52	0.53
13C-2,3,4,7,8-PeCDF	0.97	2.54 %	0.96	0.98	0.99	1.01	0.99	0.96	0.93
13C-1,2,3,4,7,8-HxCDD	0.92	1.53 %	0.90	0.93	0.93	0.93	0.93	0.93	0.90
13C-1,2,3,4,7,8-HxCDF	0.91	2.76 %	0.92	0.91	0.92	0.94	0.92	0.88	0.87
13C-1,2,3,4,7,8,9-HpCDF	0.85	2.09 %	0.85	0.83	0.85	0.89	0.86	0.86	0.85
13C-1,2,3,7,8,9-HxCDF	1.07	3.11 %	1.08	1.08	1.09	1.06	1.10	1.06	1.00

METHODS
23 / TO9A
ICAL
919 STANDARDS
05 OCT 2000.

OK
23 OCT 00

ALTA ANALYTICAL PERSPECTIVES

PART 4E

SYSTEM PERFORMANCE

"ON-GOING PRECISION & ACCURACY"

DOCUMENTATION FOR THE ANALYSIS
OF
POLYCHLORINATED DIBENZO-*P*-DIOXINS & DIBENZOFURANS

EPA METHOD 23 / TO9A / 428

PCDD/PCDF ONGOING PRECISION AND RECOVERY (OPR)

Alta Analytical Perspectives

Reviewer: ce

Matrix (MM5/PUF): OPR Data Filename: 010214P1-2

Ext. Date: Shift: Analysis Date: 14-FEB-01 Time: 11:57:29

Date: 24 Feb 01

ALL CONCENTRATIONS REPORTED ON THIS FORM ARE CONCENTRATIONS IN EXTRACT.

#275_OPR_23.TIF

	SPIKE CONC. (ng/mL)	CONC. FOUND (ng/mL)	OPR CONC. LIMITS (ng/mL)
NATIVE ANALYTES			
2,3,7,8-TCDD	5.0	4.94	3.75 - 6.25
1,2,3,7,8-PeCDD	25	24.9	18.8 - 31.2
1,2,3,4,7,8-HxCDD	25	25.4	18.8 - 31.2
1,2,3,6,7,8-HxCDD	25	24.5	18.8 - 31.2
1,2,3,7,8,9-HxCDD	25	24.3	18.8 - 31.2
1,2,3,4,6,7,8-HpCDD	25	23.0	18.8 - 31.2
OCDD	50	47.9	37.5 - 62.5
2,3,7,8-TCDF	5.0	4.23	3.75 - 6.25
1,2,3,7,8-PeCDF	25	22.2	18.8 - 31.2
2,3,4,7,8-PeCDF	25	22.2	18.8 - 31.2
1,2,3,4,7,8-HxCDF	25	22.5	18.8 - 31.2
1,2,3,6,7,8-HxCDF	25	23.9	18.8 - 31.2
2,3,4,6,7,8-HxCDF	25	23.1	18.8 - 31.2
1,2,3,7,8,9-HxCDF	25	23.1	18.8 - 31.2
1,2,3,4,6,7,8-HpCDF	25	22.3	18.8 - 31.2
1,2,3,4,7,8,9-HpCDF	25	20.9	18.8 - 31.2
OCDF	50	44.4	37.5 - 62.5

Analyst: GAG

Date: 23 Feb 01

EPA METHOD 23 / TO9A / 428

PCDD/PCDF ONGOING PRECISION AND RECOVERY (OPR)

Alta Analytical Perspectives

Reviewer: G

Matrix (MM5/PUF): OPR Data Filename: 010214P1-2

Ext. Date: Shift: Analysis Date: 14-FEB-01 Time: 11:57:29

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ALL CONCENTRATIONS REPORTED ON THIS FORM ARE CONCENTRATIONS IN EXTRACT.

LABELED COMPOUNDS	SPIKE CONC. (ng/mL)	CONC. FOUND (ng/mL)	OPR CONC. LIMITS (ng/mL)
13C-2,3,7,8-TCDD	200	201	80.0 - 260
13C-1,2,3,7,8-PeCDD	200	214	80.0 - 260
13C-1,2,3,6,7,8-HxCDD	200	198	80.0 - 260
13C-1,2,3,4,6,7,8-HpCDD	200	199	80.0 - 260
13C-OCDD	200	183	80.0 - 260
13C-2,3,7,8-TCDF	200	196	80.0 - 260
13C-1,2,3,7,8-PeCDF	200	202	80.0 - 260
13C-1,2,3,6,7,8-HxCDF	200	179	80.0 - 260
13C-1,2,3,4,6,7,8-HpCDF	200	180	80.0 - 260
13C-OCDF	200	178	80.0 - 260

Analyst: GAG

Date: 24 Feb 01

Client ID: 0_275_OPR001
Lab ID: 0_275_OPR001

Filename: 010214P1 S: 2 Acq: 14-FEB-01 11:57:29
GC Column ID: db-5 ICal: MM1_M23_0, wt/vol: 1.000

ConCal: 010214P1-
EndCal: 010214P1-

	Name	Resp	RA		RRF	RT	Conc	Qualif.	CDE	noise	Fac	DL	EMPC / Rec
	2,3,7,8-TCDD	2.09e+06	0.80	y	1.26	27:44	4.94			908	2.5	0.0392	
	1,2,3,7,8-PeCDD	7.32e+06	1.56	y	1.01	33:12	24.9			566	2.5	0.0451	
	1,2,3,4,7,8-HxCDD	6.80e+06	1.26	y	1.14	37:06	25.4			2774	2.5	0.222	
	1,2,3,6,7,8-HxCDD	5.90e+06	1.26	y	1.02	37:13	24.5			2774	2.5	0.247	
	1,2,3,7,8,9-HxCDD	6.53e+06	1.26	y	1.14	37:32	24.3			2774	2.5	0.221	
	1,2,3,4,6,7,8-HpCDD	5.96e+06	1.00	y	1.13	41:31	23.0			2433	2.5	0.270	
	OCDD	8.43e+06	0.87	y	1.03	46:51	47.9			898	2.5	0.179	
	2,3,7,8-TCDF	1.85e+06	0.75	y	1.05	26:51	4.23			1519	2.5	0.0642	
	1,2,3,7,8-PeCDF	8.96e+06	1.54	y	1.04	31:43	22.2			1090	2.5	0.0615	
	2,3,4,7,8-PeCDF	9.10e+06	1.54	y	1.05	32:51	22.2			1090	2.5	0.0605	
	1,2,3,4,7,8-HxCDF	7.46e+06	1.22	y	1.13	36:07	22.5			2199	2.5	0.0882	
	1,2,3,6,7,8-HxCDF	8.67e+06	1.23	y	1.24	36:16	23.9			2199	2.5	0.0806	
	2,3,4,6,7,8-HxCDF	7.88e+06	1.22	y	1.16	36:55	23.1			2199	2.5	0.0857	
	1,2,3,7,8,9-HxCDF	6.89e+06	1.20	y	1.02	37:56	23.1			2199	2.5	0.0980	
	1,2,3,4,6,7,8-HpCDF	7.10e+06	1.03	y	1.54	39:53	22.3			1801	2.5	0.101	
	1,2,3,4,7,8,9-HpCDF	5.63e+06	1.02	y	1.30	42:20	20.9			1801	2.5	0.120	
	OCDF	9.38e+06	0.89	y	1.15	47:10	44.4			2019	2.5	0.308	
													EMPC
	Total Tetra-Dioxins	2.09e+06	0.87	y	1.26	21:51	4.95			908	2.5	0.0392	5.00
	Total Penta-Dioxins	7.32e+06	1.56	y	1.01	33:12	24.9			566	2.5	0.0451	25.1
	Total Hexa-Dioxins	1.92e+07	1.26	y	1.10	37:06	74.1			2774	2.5	0.229	74.4
	Total Hepta-Dioxins	6.09e+06	0.90	y	1.13	40:20	23.5			2433	2.5	0.270	23.9
	Total Tetra-Furans	1.89e+06	0.78	y	1.05	25:28	4.32			1519	2.5	0.0642	4.59
	1st Fnc. Penta-Furans	*	*	n	1.05	NotF,	*			1802	2.5	0.101	0.213
	Total Penta-Furans	1.84e+07	1.70	y	1.05	30:35	45.3			1090	2.5	0.0610	
	PeCDF Totals:						45.3						45.9
	Total Hexa-Furans	3.09e+07	1.22	y	1.14	36:07	92.7			2199	2.5	0.0876	93.2
	Total Hepta-Furans	1.28e+07	1.03	y	1.42	39:53	43.3			1801	2.5	0.110	44.1
													Rec
IS	13C-2,3,7,8-TCDD	6.69e+07	0.79	y	1.13	27:43	201						101
IS	13C-1,2,3,7,8-PeCDD	5.81e+07	1.54	y	0.93	33:10	214						107
IS	13C-1,2,3,6,7,8-HxCDD	4.71e+07	1.25	y	0.93	37:12	198						99.0
IS	13C-1,2,3,4,6,7,8-HpCDD	4.59e+07	1.06	y	0.91	41:30	199						99.5
IS	13C-OCDD	3.43e+07	0.90	y	0.73	46:50	183						91.7
IS	13C-2,3,7,8-TCDF	8.34e+07	0.78	y	1.06	26:49	196						98.1
IS	13C-1,2,3,7,8-PeCDF	7.77e+07	1.56	y	0.96	31:42	202						101
IS	13C-1,2,3,6,7,8-HxCDF	5.86e+07	0.51	y	1.28	36:15	179						89.7
IS	13C-1,2,3,4,6,7,8-HpCDF	4.14e+07	0.44	y	0.90	39:52	180						90.0
IS	13C-OCDF	3.68e+07	0.88	y	0.81	47:09	178						89.2
RS/RT	13C-1,2,3,4-TCDD	5.87e+07	0.79	y	1.00	27:03	200						-
RS	13C-1,2,3,4-TCDF	8.02e+07	0.77	y	1.00	25:27	200						-
RS/RT	13C-1,2,3,7,8,9-HxCDD	5.10e+07	1.25	y	1.00	37:31	200						-
PS	37Cl-2,3,7,8-TCDD	2.31e+04			0.51	27:44	0.134						0.0672
PS	13C-2,3,4,7,8-PeCDF	*	*	n	0.97	NotF,	*						*
PS	13C-1,2,3,4,7,8-HxCDD	*	*	n	0.92	NotF,	*						*
PS	13C-1,2,3,4,7,8-HxCDF	1.38e+05	0.46	y	0.91	36:06	0.517						0.259
PS	13C-1,2,3,4,7,8,9-HpCDF	1.35e+05	0.44	y	0.85	42:20	0.765						0.383
AS	13C-1,2,3,7,8,9-HxCDF	4.96e+07	0.51	y	1.07	37:54	182						91.0

Reviewer: C

Date: 24Feb01

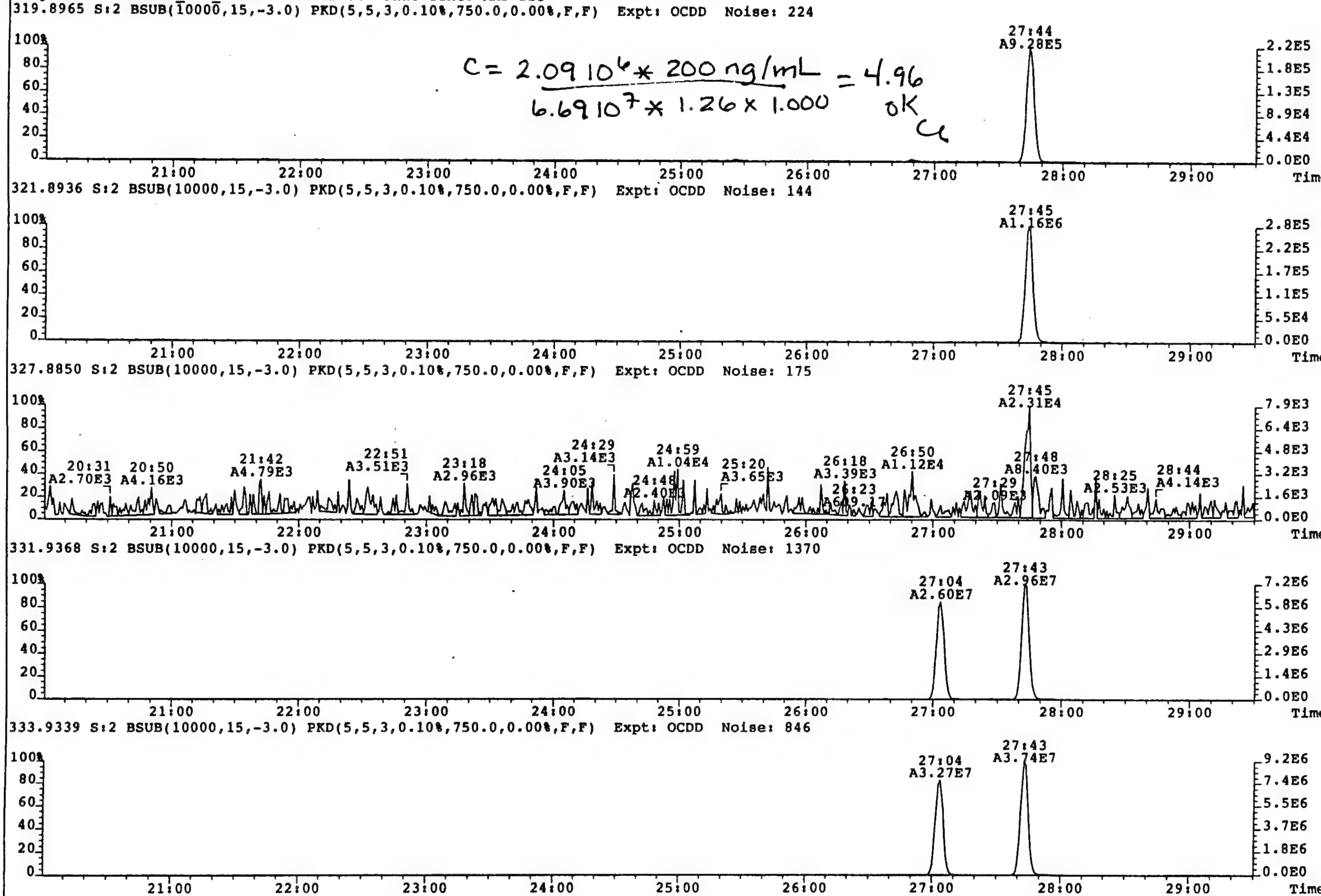
Analyst: GAG

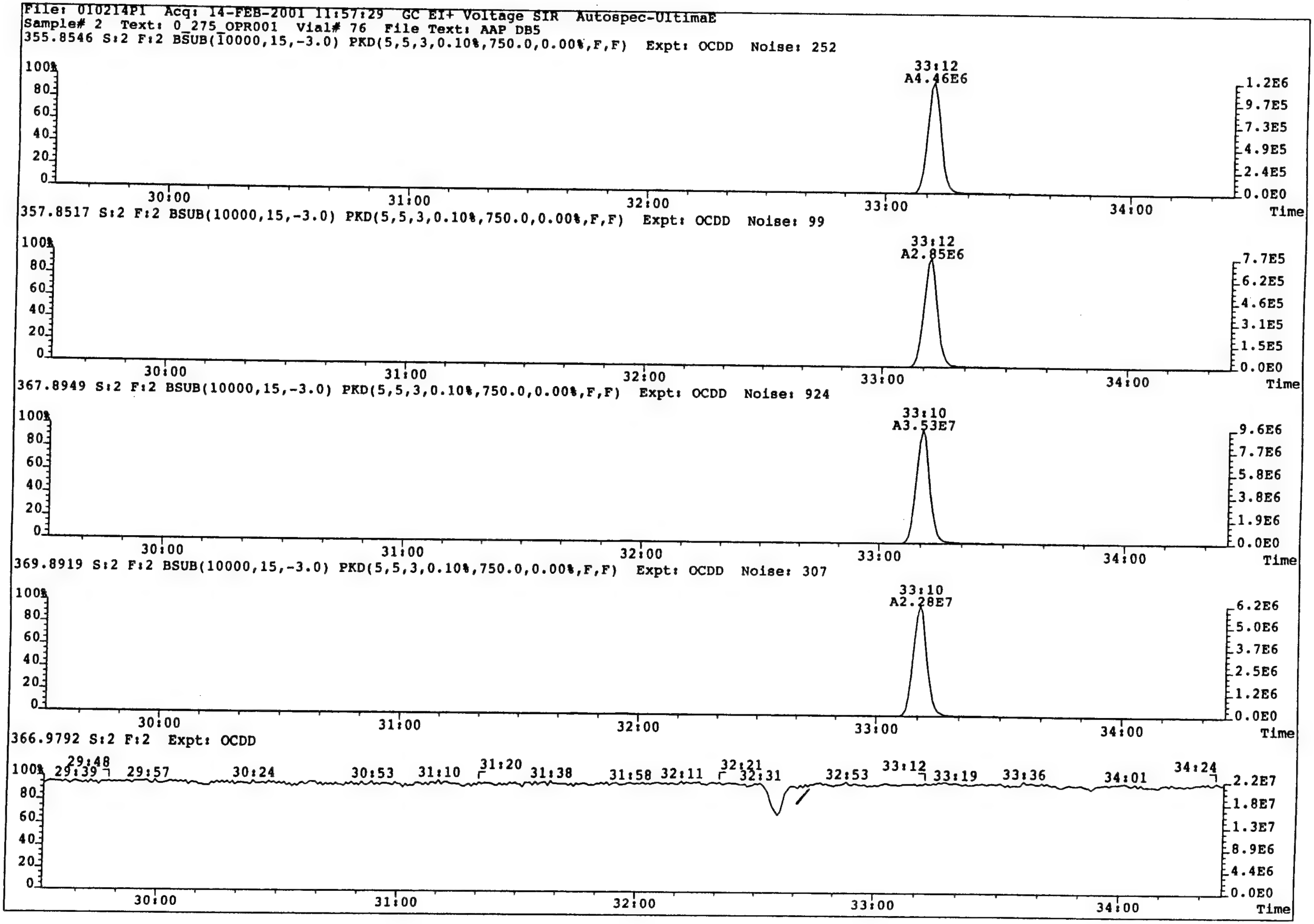
Date: 24Feb01

File: 010214P1 Acq: 14-FEB-2001 11:57:29 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 2 Text: 0_275_OPR001 Vial# 76 File Text: AAP DB5

$$C = \frac{2.09\,10^{6} * 200\ ng/mL}{6.69\,10^{7} * 1.26 \times 1.000} = 4.96$$

oK

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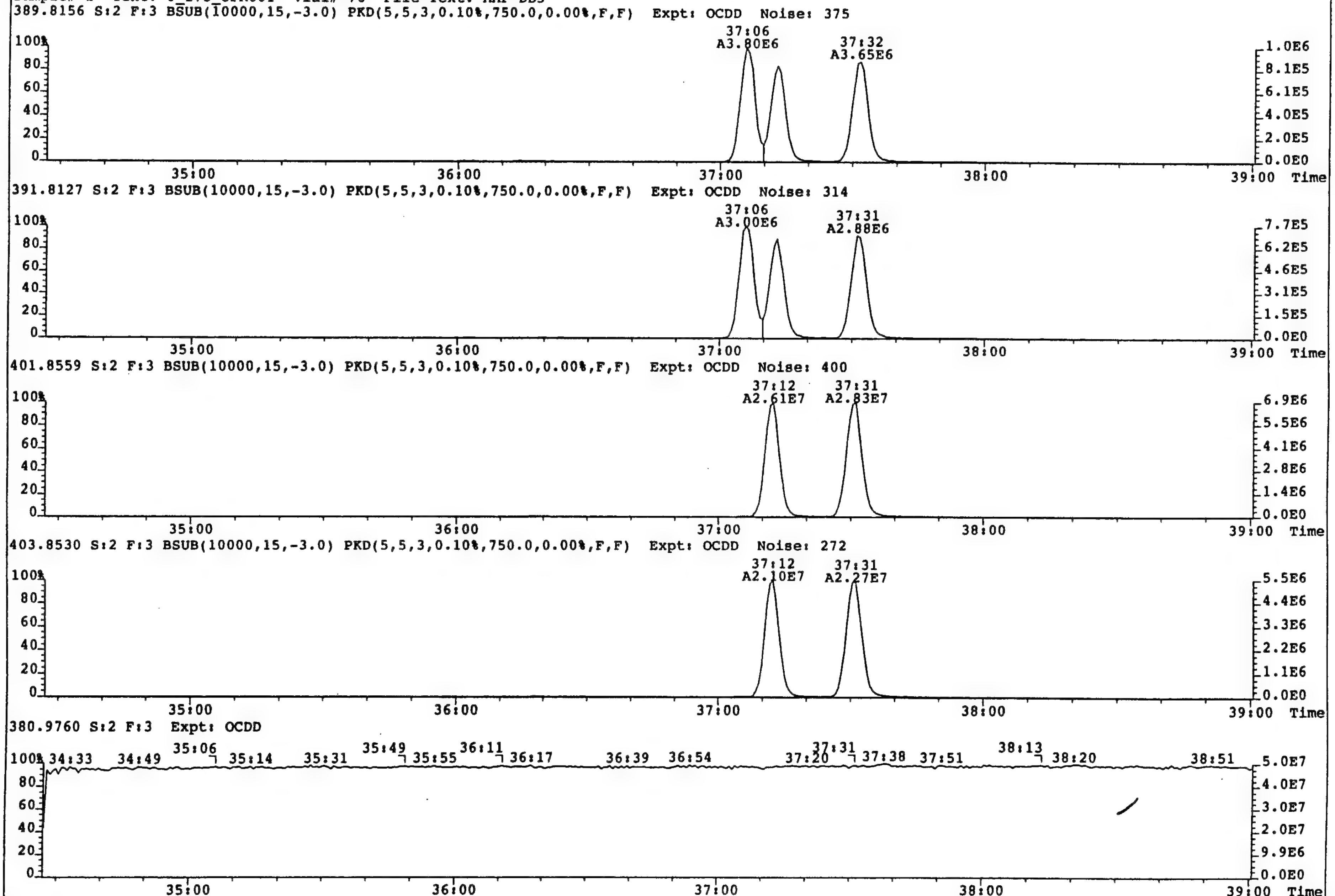
Sample# 2 Text: 0_275_OPR001 Vial# 76 File Text: AAP DB5
355.8546 S:2 F:2 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 252
33:12
A4.46E6
1.2E6
9.7E5
7.3E5
4.9E5
2.4E5
0.0E0
357.8517 S:2 F:2 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 99
33:12
A2.85E6
7.7E5
6.2E5
4.6E5
3.1E5
1.5E5
0.0E0
367.8949 S:2 F:2 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 924
33:10
A3.53E7
9.6E6
7.7E6
5.8E6
3.8E6
1.9E6
0.0E0
369.8919 S:2 F:2 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 307
33:10
A2.28E7
6.2E6
5.0E6
3.7E6
2.5E6
1.2E6
0.0E0
366.9792 S:2 F:2 Expt: OCDD
29:39 29:48 29:57 30:24 30:53 31:10 31:20 31:38 31:58 32:11 32:21 32:31 32:53 33:12 33:19 33:36 34:01 34:24
2.2E7
1.8E7
1.3E7
8.9E6
4.4E6
0.0E0
100%
80
60
40
20
0
30:00
31:00
32:00
33:00
34:00
Time

File: 010214P1 Acq: 14-FEB-2001 11:57:29 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 2 Text: 0_275_OPR001 Vial# 76 File Text: AAP DB5



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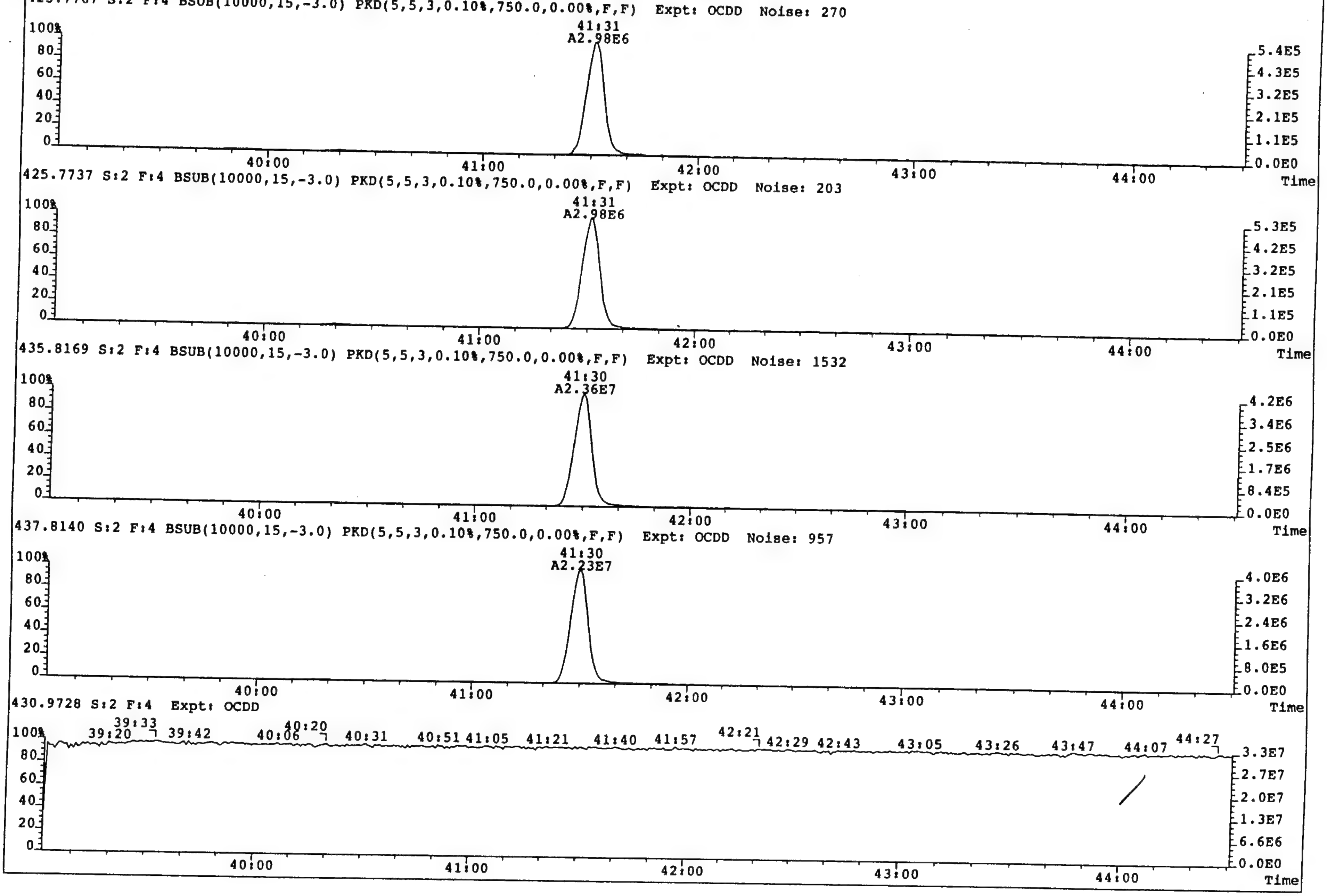
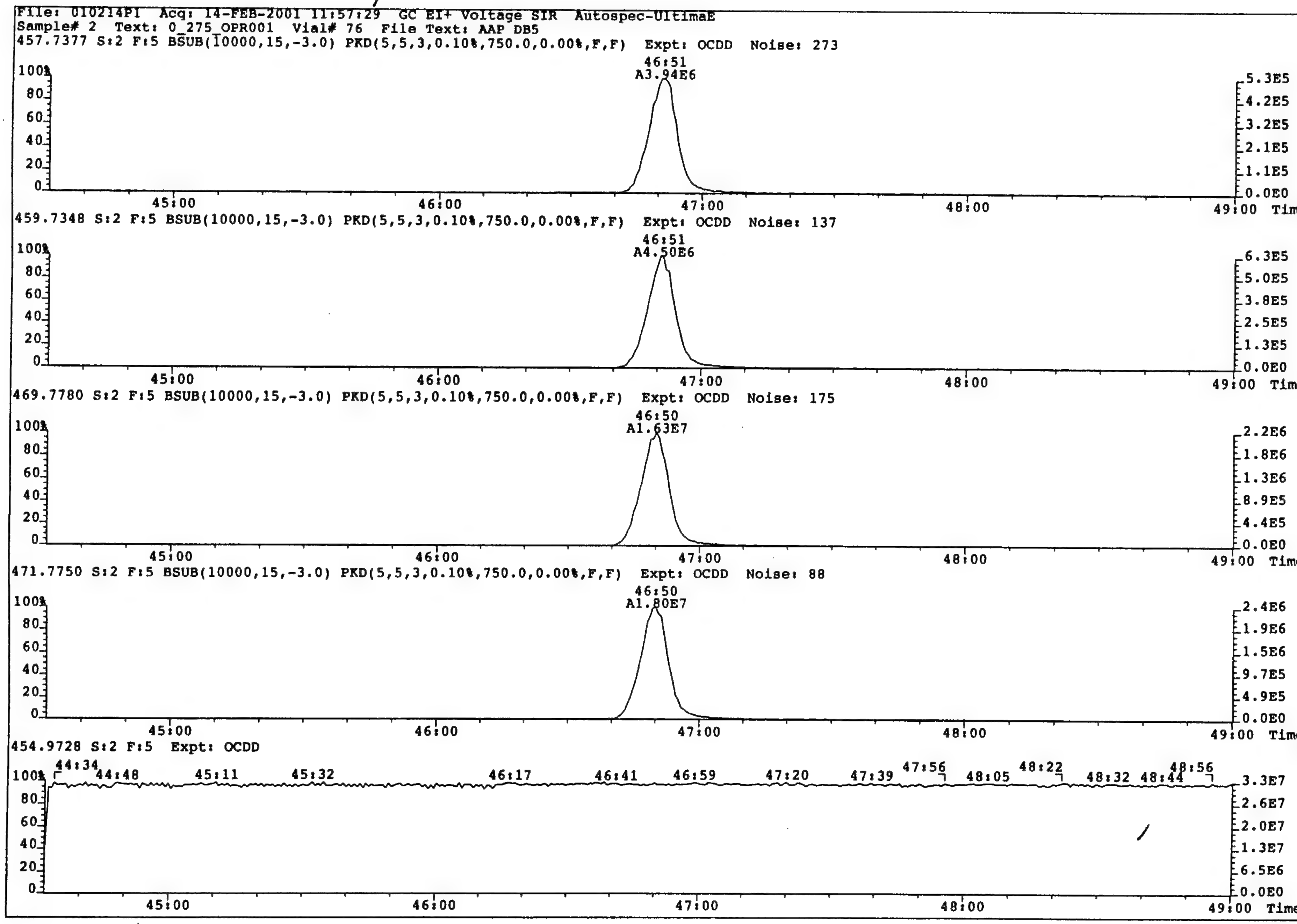
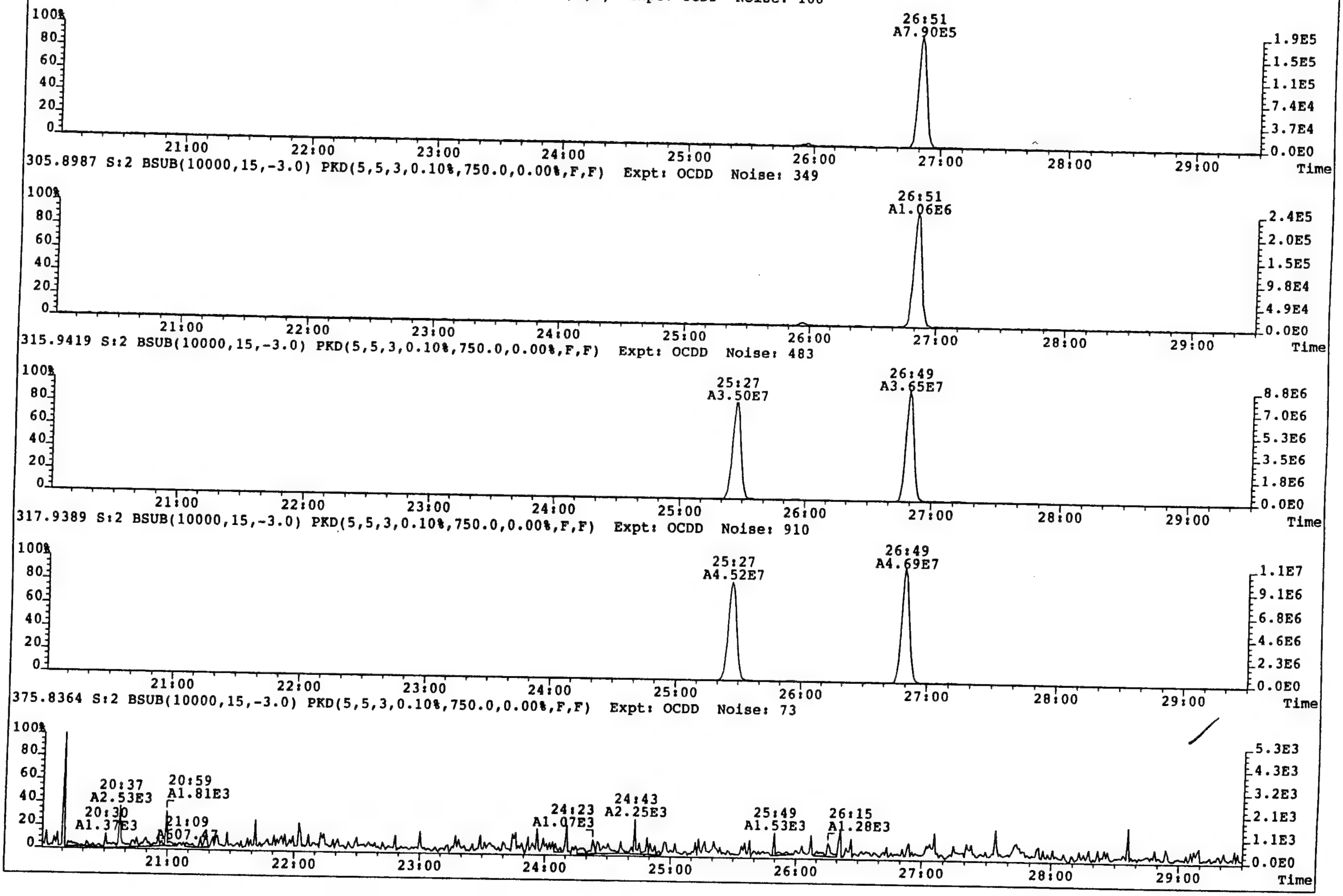
Sample# 2 Text: 0_275_OPR001 Vial# 76 File Text: AAP DB5




File: 010214P1 Acq: 14-FEB-2001 11:57:29 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 2 Text: 0_275_OPR001 Vial# 76 File Text: AAP DB5
457.7377 S:2 F:5 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 273
46:51
A3.94E6
459.7348 S:2 F:5 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 137
46:51
A4.50E6
469.7780 S:2 F:5 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 175
46:50
A1.63E7
471.7750 S:2 F:5 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 88
46:50
A1.80E7
454.9728 S:2 F:5 Expt: OCDD
44:34 44:48 45:11 45:32 46:17 46:41 46:59 47:20 47:39 47:56 48:05 48:22 48:32 48:44 48:56
45:00 46:00 47:00 48:00 49:00 Time

File: 010214P1 Acq: 14-FEB-2001 11:57:29 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 2 Text: 0_275_OPR001 Vial# 76 File Text: AAP DB5
303.9016 S:2 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 168



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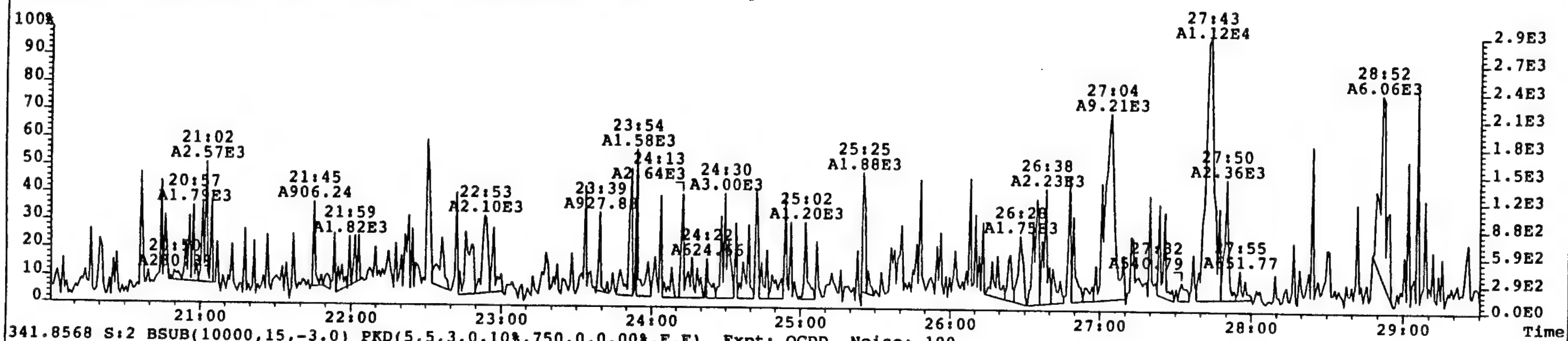
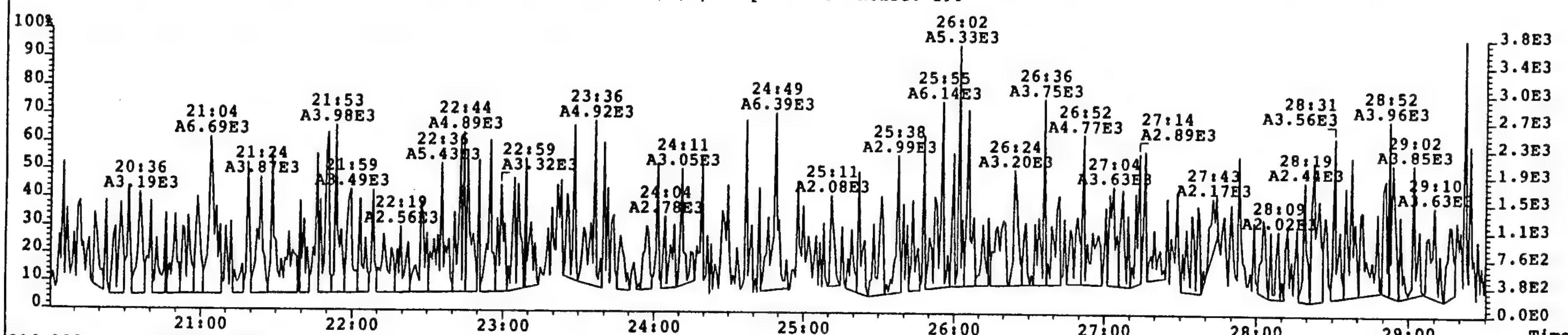
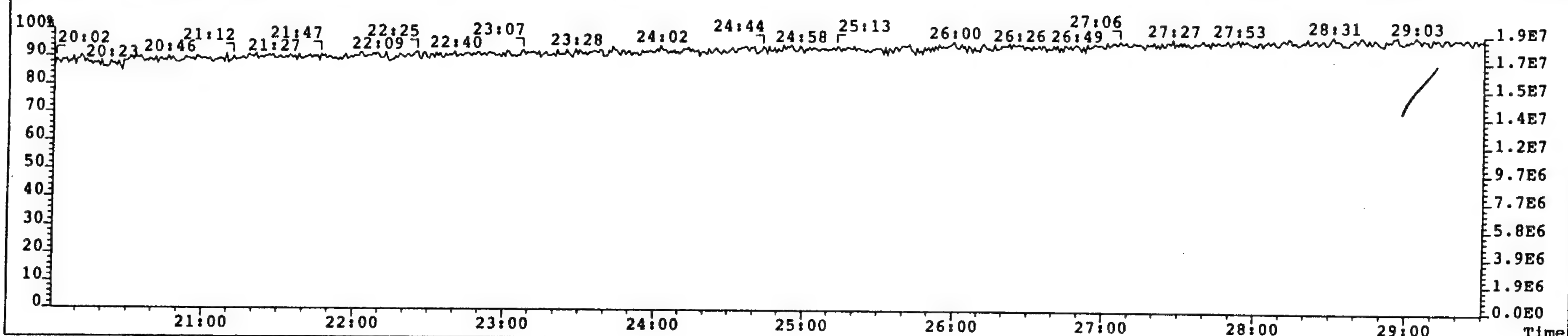
Sample# 2 Text: 0_275_OPR001 Vial# 76 File Text: AAP DB5
339.8597 S:2 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 74



341.8568 S:2 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 190



316.9824 S:2 Expt: OCDD



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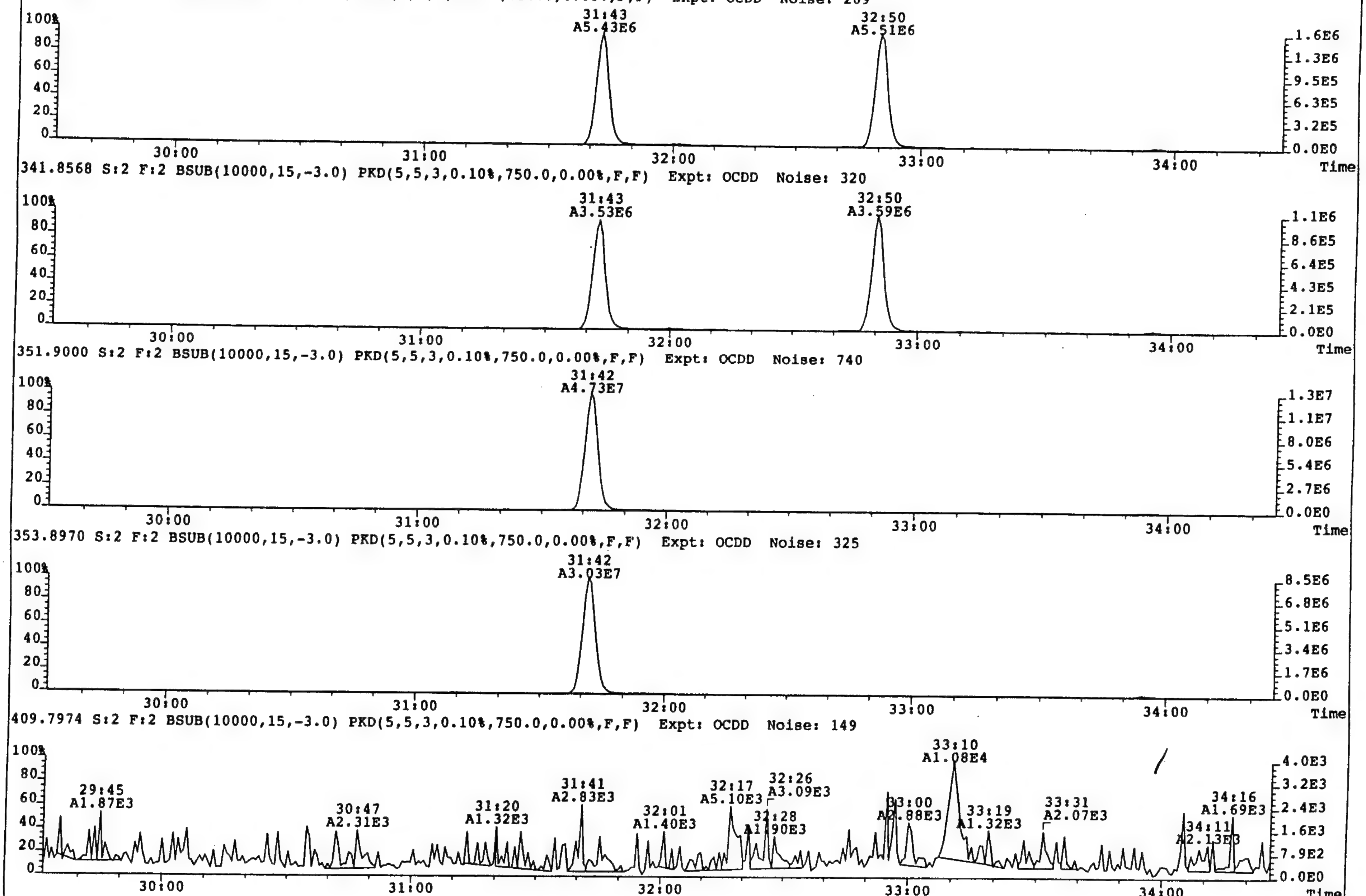
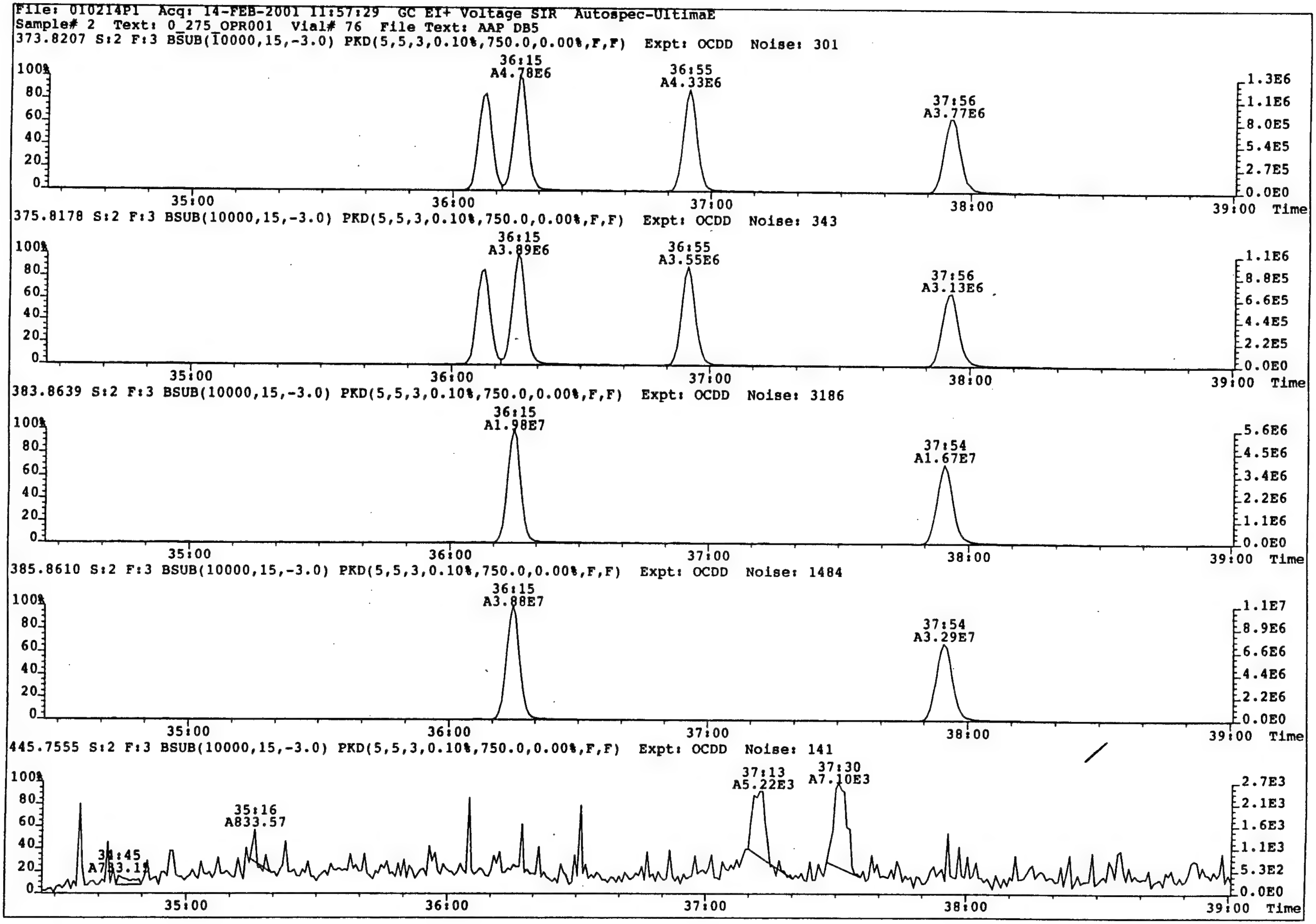
Sample# 2 Text: 0_275_OPR001 Vial# 76 File Text: AAP DB5
339.8597 S:2 F:2 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 209

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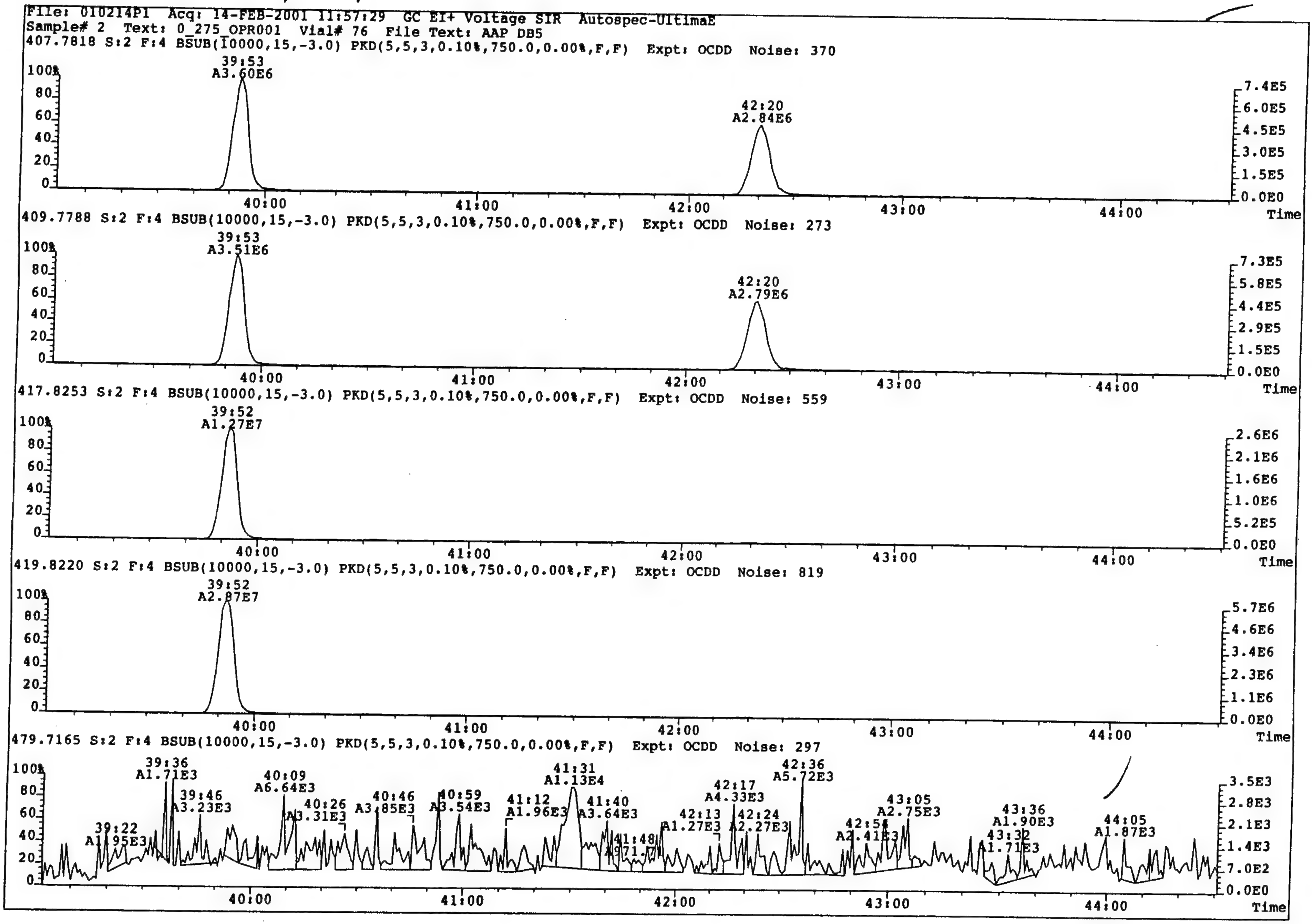
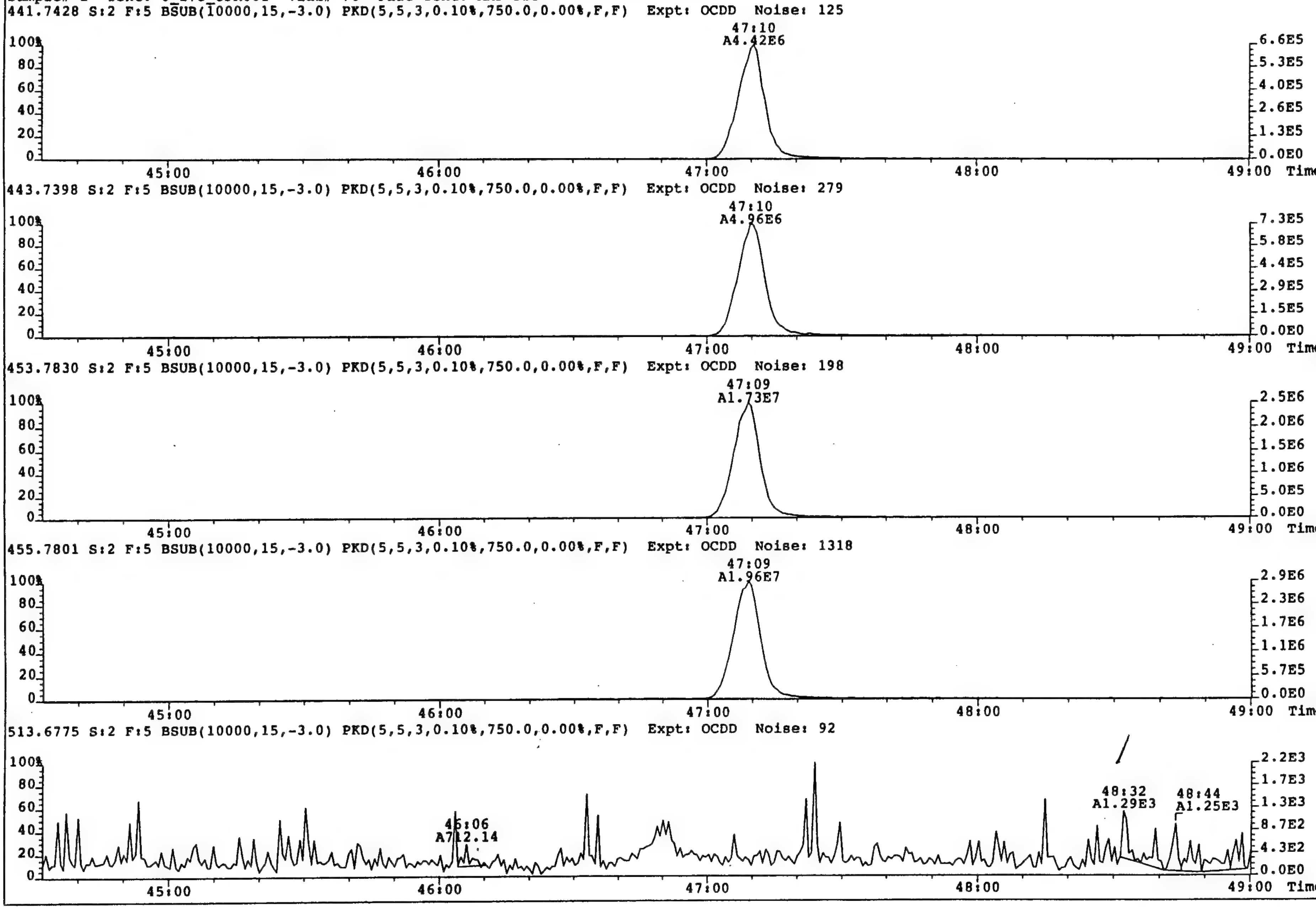
Sample# 2 Text: 0_275_OPR001 Vial# 76 File Text: AAP DB5
373.8207 S:2 F:3 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 301
36:15 A4.78E6
36:55 A4.33E6
37:56 A3.77E6
375.8178 S:2 F:3 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 343
36:15 A3.89E6
36:55 A3.55E6
37:56 A3.13E6
383.8639 S:2 F:3 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 3186
36:15 A1.98E7
37:54 A1.67E7
385.8610 S:2 F:3 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 1484
36:15 A3.88E7
37:54 A3.29E7
445.7555 S:2 F:3 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 141
35:16 A833.57
37:13 A5.22E3
37:30 A7.10E3
35:00 36:00 37:00 38:00 39:00 Time


File: 010214P1 Acq: 14-FEB-2001 11:57:29 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 2 Text: 0_275_OPR001 Vial# 76 File Text: AAP DB5
407.7818 S:2 F:4 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 370
39:53
A3.60E6
42:20
A2.84E6
409.7788 S:2 F:4 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 273
39:53
A3.51E6
42:20
A2.79E6
417.8253 S:2 F:4 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 559
39:52
A1.27E7
419.8220 S:2 F:4 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 819
39:52
A2.87E7
479.7165 S:2 F:4 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 297
40:00
41:00
42:00
43:00
44:00
Time

File: 010214P1 Acq: 14-FEB-2001 11:57:29 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 2 Text: 0_275_OPR001 Vial# 76 File Text: AAP DB5



APPENDIX D

CALCULATIONS

Summary of Stack Gas Parameters and Test Results
Malcolm Grow Medical Center - Andrews AFB, MD
US EPA Test Method 29 - Multiple Metals

	RUN NUMBER	M29-1	M29-2	M29-3	
	RUN DATE	2/2/01	2/2/01	2/2/01	Average
	RUN TIME	0945-1050	1230-1335	1405-1510	
	MEASURED DATA				
γ	Meter Box Correction Factor	0.995	0.995	0.995	0.995
ΔH	Avg Meter Orifice Pressure, in. H_2	1.71	1.69	1.74	1.71
P_{bar}	Barometric Pressure, inches Hg	29.90	29.90	29.90	29.90
V_m	Sample Volume, ft^3	43.850	42.030	46.450	44.110
T_m	Average Meter Temperature, °F	102	103	103	103
P_{static}	Stack Static Pressure, inches H_2O	0.15	0.2	0.15	0.15
T_s	Average Stack Temperature, °F	171	172	172	172
V_{lc}	Condensate Collected, ml	354.9	339.1	356.4	350.1
CO_2	Carbon Dioxide content, % by volu	6.3	7.2	6.0	6.5
O_2	Oxygen content, % by volume	11.6	11.9	12.3	11.9
N_2	Nitrogen content, % by volume	82.1	80.9	81.7	81.6
C_p	Pitot Tube Coefficient	0.84	0.84	0.84	0.84
$\Delta p^{1/2}$	Average Square Root Δp, (in. H_2O)	0.5844	0.5811	0.5893	0.5849
Θ	Sample Run Duration, minutes	60	60	60	60
D_n	Nozzle Diameter, inches	0.310	0.310	0.310	0.310
	CALCULATED DATA				
A_n	Nozzle Area, ft^2	0.000524	0.000524	0.000524	0.000524
$V_{m(std)}$	Standard Meter Volume, ft^3	41.144	39.309	43.496	41.316
$V_{m(std)}$	Standard Meter Volume, m^3	1.165	1.113	1.232	1.170
Q_m	Average Sampling Rate, dscfm	0.686	0.655	0.725	0.689
P_s	Stack Pressure, inches Hg	29.91	29.91	29.91	29.91
B_{ws}	Moisture, % by volume	28.9	28.9	27.8	28.5
$B_{ws(sat)}$	Moisture (at saturation), % by volu	42.0	42.3	42.1	42.1
V_{wstd}	Standard Water Vapor Volume, ft^3	16.705	15.961	16.776	16.481
$1-B_{ws}$	Dry Mole Fraction	0.711	0.711	0.722	0.715
M_d	Molecular Weight (d.b.), lb/lb•mole	29.47	29.63	29.45	29.52
M_s	Molecular Weight (w.b.), lb/lb•mole	26.16	26.27	26.26	26.23
V_s	Stack Gas Velocity, ft/s	37.7	37.4	37.9	37.7
A	Stack Area, ft^2	1.289	1.289	1.289	1.289
Q_a	Stack Gas Volumetric flow, acfm	2,916	2,894	2,934	2,915
Q_s	Stack Gas Volumetric flow, dscfm	1,733	1,719	1,769	1,740
Q_s	Stack Gas Volumetric flow, dscmm	49.1	48.7	50.1	49.3
I	Isokinetic Sampling Ratio, %	97.3	93.7	100.8	97.3

Summary of Stack Gas Parameters and Test Results
Malcolm Grow Medical Center - Andrews AFB, MD
US EPA Test Method 29 - Multiple Metals

	RUN NUMBER	***M29-1***	***M29-2***	***M29-3***	
	RUN DATE	***2/2/01***	***2/2/01***	***2/2/01***	***Average***
	RUN TIME	***0945-1050***	***1230-1335***	***1405-1510***	
	EMISSIONS DATA				
	Particulate Matter				
PM	Target Catch, g	0.0063	0.0750	0.0711	0.0508
C_{PM}	Concentration, gr/dscf	0.00236	0.0294	0.0252	0.0190
C_{PM} @ 7% O	Concentration, gr/dscf @ 7% O_2	0.0035	0.0455	0.0408	0.0299
C_{PM}	Concentration, mg/dscm	5.41	67.4	57.7	43.5
C_{PM} @ 7% O	Concentration, mg/dscm @ 7% O_2	8.08	104.1	93.3	68.5
E_{PM}	Emission Rate, lb/hr	0.0351	0.434	0.383	0.284
E_{PM}	Emission Rate, kg/hr	0.0159	0.197	0.174	0.129
	Cadmium				
Cd	Target Catch, µg	3.55	6.7	6.33	5.51
C_{Cd}	Concentration, mg/dscm	0.00305	0.00598	0.00514	0.00472
C_{Cd} @ 7% O	Concentration, mg/dscm @ 7% O_2	0.00455	0.00924	0.00831	0.00737
E_{Cd}	Emission Rate, g/hr	0.00897	0.0175	0.0154	0.0140
	Lead				
Pb	Target Catch, µg	434.1	554	481.2	489.9
C_{Pb}	Concentration, mg/dscm	0.373	0.498	0.391	0.420
C_{Pb} @ 7% O_2	Concentration, mg/dscm @ 7% O_2	0.557	0.769	0.631	0.653
E_{Pb}	Emission Rate, g/hr	1.10	1.45	1.17	1.24
	Mercury				
Hg	Target Catch, µg	73.0	4.41	0.55	25.99
C_{Hg}	Concentration, mg/dscm	0.0627	0.00396	0.000447	0.0224
C_{Hg} @ 7% O	Concentration, mg/dscm @ 7% O_2	0.094	0.00612	0.000722	0.0335
E_{Hg}	Emission Rate, g/hr	0.184	0.0116	0.00134	0.0658

Summary of Stack Gas Parameters and Test Results
Malcolm Grow Medical Center - Andrews AFB, MD
US EPA Test Method 23 - PCDD / PCDF
Medical Waste Incinerator Stack

	RUN NUMBER	***M-23-1***	***M-23-2***	***M-23-3***	
	RUN DATE	***1/31/01***	***1/31/01***	***2/1/01***	***Average***
	RUN TIME	***1026-1450***	***1610-2040***	***0910-1330***	
	MEASURED DATA				
γ	Meter Box Correction Factor	0.995	0.995	0.995	0.995
ΔH	Avg Meter Orifice Pressure, in. H_2O	1.57	1.785	1.751	1.701
P_{bar}	Barometric Pressure, inches Hg	29.90	29.90	29.90	29.90
V_m	Sample Volume, ft^3	172.731	182.040	180.182	178.318
T_m	Average Meter Temperature, °F	90	105	100	98
P_{static}	Stack Static Pressure, inches H_2O	0.15	0.15	0.2	0.15
T_s	Average Stack Temperature, °F	171	172	172	172
V_{lc}	Condensate Collected, ml	1390.2	1256.9	1315.4	1320.8
CO_2	Carbon Dioxide content, % by volu	6.0	5.9	5.4	5.8
O_2	Oxygen content, % by volume	11.4	12.1	10.8	11.4
N_2	Nitrogen content, % by volume	82.6	82.0	83.8	82.8
C_p	Pitot Tube Coefficient	0.84	0.84	0.84	0.84
$\Delta p^{1/2}$	Average Square Root Dp, (in. H_2O)[1]	0.5945	0.5783	0.5919	0.5882
Θ	Sample Run Duration, minutes	240	240	240	240
D_n	Nozzle Diameter, inches	0.310	0.310	0.310	0.310
	CALCULATED DATA				
A_n	Nozzle Area, ft^2	0.00052	0.00052	0.00052	0.00052
$V_{m(std)}$	Standard Meter Volume, dscf	165.499	169.914	169.629	168.347
$V_{m(std)}$	Standard Meter Volume, dscm	4.686	4.811	4.803	4.767
P_s	Stack Pressure, inches Hg	29.91	29.91	29.91	29.91
B_{ws}	Moisture, % by volume	28.3	25.8	26.7	27.0
$B_{ws(sat)}$	Moisture (at saturation), % by volu	41.9	42.4	42.4	42.2
V_{wstd}	Standard Water Vapor Volume, ft^3	65.437	59.162	61.916	62.172
$1-B_{ws}$	Dry Mole Fraction	0.717	0.742	0.733	0.730
M_d	Molecular Weight (d.b.), lb/lb•mole	29.42	29.43	29.30	29.38
M_s	Molecular Weight (w.b.), lb/lb•mole	26.18	26.48	26.28	26.31
V_s	Stack Gas Velocity, ft/s	38.3	37.1	38.1	37.8
A	Stack Area, ft^2	1.289	1.289	1.289	1.289
Q_a	Stack Gas Volumetric flow, acfm	2,965	2,869	2,947	2,927
Q_s	Stack Gas Volumetric flow, dscfm	1,776	1,777	1,803	1,785
$Q_{s(cmm)}$	Stack Gas Volumetric flow, dscmm	50.3	50.3	51.1	50.6
I	Isokinetic Sampling Ratio, %	95.5	98.0	96.4	96.6

Summary of Stack Gas Parameters and Test Results
Malcolm Grow Medical Center - Andrews AFB, MD
US EPA Test Method 23 - PCDD / PCDF
Baghouse Inlet

	RUN NUMBER	***M-23-1***	***M-23-2***	***M-23-3***	
	RUN DATE	***36922***	***36922***	***36923***	***Average***
	RUN TIME	***1026-1450***	***1610-2040***	***0910-1330***	
	EMISSIONS DATA				
	DIOXINS:				
	2378 TCDD				
(ng)	Catch, ng	(0.000792)	0.000945	(0.000580)	(0.000315)
(ng/dscm)	Concentration, ng/dscm, as measur	(0.000169)	0.000196	(0.000121)	(0.0000655)
(µg/hr)	Emission Rate, µg/hr	(0.000510)	0.000593	(0.000370)	(0.000198)
	Total TCDD				
(ng)	Catch, ng	0.0173	0.013	0.00393	0.01141
(ng/dscm)	Concentration, ng/dscm, as measur	0.00369	0.00270	0.000818	0.00240
(µg/hr)	Emission Rate, µg/hr	0.0111	0.00816	0.00251	0.00727
	12378 PeCDD				
(ng)	Catch, ng	{0.00174}	0.00244	(0.001630)	(0.00139)
(ng/dscm)	Concentration, ng/dscm, as measur	{0.000371}	0.000507	(0.000339)	(0.000293)
(µg/hr)	Emission Rate, µg/hr	{0.00112}	0.00153	(0.00104)	(0.000884)
	Total PeCDD				
(ng)	Catch, ng	0.0413	0.0313	0.0188	0.0305
(ng/dscm)	Concentration, ng/dscm, as measur	0.00881	0.00651	0.00391	0.00641
(µg/hr)	Emission Rate, µg/hr	0.0266	0.0196	0.0120	0.0194
	123478 HxCDD				
(ng)	Catch, ng	0.00456	{0.00196}	0.00254	{0.00302}
(ng/dscm)	Concentration, ng/dscm, as measur	0.000973	{0.000407}	0.000529	{0.000636}
(µg/hr)	Emission Rate, µg/hr	0.00294	{0.00123}	0.00162	{0.00193}
	123678 HxCDD				
(ng)	Catch, ng	0.00758	{0.00504}	0.00463	{0.00575}
(ng/dscm)	Concentration, ng/dscm, as measur	0.00162	{0.00105}	0.000964	{0.00121}
(µg/hr)	Emission Rate, µg/hr	0.00488	{0.00316}	0.00295	{0.00367}

( ) Not Detected. Value shown is the detection limit. ND values are used as zero (0) in totals and averages.

{ } Estimated Maximum Possible Concentration. EMPC values ARE included in totals and averages.

Summary of Stack Gas Parameters and Test Results
Malcolm Grow Medical Center - Andrews AFB, MD
US EPA Test Method 23 - PCDD / PCDF
Baghouse Inlet

	RUN NUMBER	M-23-1	M-23-2	M-23-3	
	RUN DATE	36922	36922	36923	Average
	RUN TIME	1026-1450	1610-2040	0910-1330	
	EMISSIONS DATA -Continued				
	DIOXINS - Continued				
	123789 HxCDD				
(ng)	Catch, ng	0.00464	0.00276	{0.00225}	{0.00322}
(ng/dscm)	Concentration, ng/dscm, as measur	0.000990	0.000574	{0.000468}	{0.000677}
(µg/hr)	Emission Rate, µg/hr	0.00299	0.00173	{0.00144}	{0.00205}
	Total HxCDD				
(ng)	Catch, ng	0.0682	0.0429	0.0389	0.0500
(ng/dscm)	Concentration, ng/dscm, as measur	0.0146	0.00892	0.00810	0.0105
(µg/hr)	Emission Rate, µg/hr	0.0439	0.0269	0.0248	0.0319
	1234678 HpCDD				
(ng)	Catch, ng	0.0273	0.0215	0.0205	0.0231
(ng/dscm)	Concentration, ng/dscm, as measur	0.00583	0.00447	0.00427	0.00485
(µg/hr)	Emission Rate, µg/hr	0.0176	0.0135	0.0131	0.0147
	Total HpCDD				
(ng)	Catch, ng	0.0556	0.0444	0.0415	0.0472
(ng/dscm)	Concentration, ng/dscm, as measur	0.01186	0.00923	0.00864	0.00991
(µg/hr)	Emission Rate, µg/hr	0.0358	0.0279	0.0265	0.0300
	12346789 OCDD				
(ng)	Catch, ng	0.0744	0.0571	0.0633	0.0649
(ng/dscm)	Concentration, ng/dscm, as measur	0.0159	0.0119	0.0132	0.0136
(µg/hr)	Emission Rate, µg/hr	0.0479	0.0358	0.0404	0.0414
	Total PCDD				
(ng)	Catch, ng	0.2568	0.1887	0.16643	0.2040
(ng/dscm)	Concentration, ng/dscm, as measur	0.0548	0.0392	0.0346	0.0429
(µg/hr)	Emission Rate, µg/hr	0.165	0.118	0.106	0.130

( ) Not Detected. Value shown is the detection limit. ND values are used as zero (0) in totals and averages.

{ } Estimated Maximum Possible Concentration. EMPC values ARE included in totals and averages.

	RUN NUMBER	M-23-1	I-M23-2	I-M23-3	
	RUN DATE	36922	I-M23-2	I-M23-3	Average
	RUN TIME	1026-1450	I-M23-2	I-M23-3	
	EMISSIONS DATA - Continued				
	FURANS				
	2378 TCDF				
(ng)	Catch, ng	0.0113	0.00877	0.00739	0.00915
(ng/dscm)	Concentration, ng/dscm, as measur	0.00241	0.00182	0.00154	0.00192
(µg/hr)	Emission Rate, µg/hr	0.00727	0.00550	0.00471	0.00583
	Total TCDF				
(ng)	Catch, ng	0.345	0.265	0.205	0.272
(ng/dscm)	Concentration, ng/dscm, as measur	0.0736	0.0551	0.0427	0.0571
(µg/hr)	Emission Rate, µg/hr	0.222	0.166	0.131	0.173
	12378 PeCDF				
(ng)	Catch, ng	0.0209	0.0152	0.0116	0.0159
(ng/dscm)	Concentration, ng/dscm, as measur	0.00446	0.00316	0.00241	0.00334
(µg/hr)	Emission Rate, µg/hr	0.0135	0.00954	0.00740	0.0101
	23478 PeCDF				
(ng)	Catch, ng	0.0466	0.0361	0.0265	0.0364
(ng/dscm)	Concentration, ng/dscm, as measur	0.00994	0.00750	0.00552	0.00765
(µg/hr)	Emission Rate, µg/hr	0.0300	0.0227	0.0169	0.0232
	Total PeCDF				
(ng)	Catch, ng	0.451	0.354	0.277	0.3607
(ng/dscm)	Concentration, ng/dscm, as measur	0.0962	0.0736	0.0577	0.07583
(µg/hr)	Emission Rate, µg/hr	0.290	0.222	0.177	0.2297
	123478 HxCDF				
(ng)	Catch, ng	0.0489	0.04	0.0289	0.0393
(ng/dscm)	Concentration, ng/dscm, as measur	0.0104	0.00831	0.00602	0.00825
(µg/hr)	Emission Rate, µg/hr	0.0315	0.0251	0.0184	0.0250

( ) Not Detected. Value shown is the detection limit. ND values are used as zero (0) in totals and averages.

{ } Estimated Maximum Possible Concentration. EMPC values ARE included in totals and averages.

Summary of Stack Gas Parameters and Test Results
Malcolm Grow Medical Center - Andrews AFB, MD
US EPA Test Method 23 - PCDD / PCDF
Baghouse Inlet

	RUN NUMBER	M-23-1	M-23-2	M-23-3	
	RUN DATE	36922	36922	36923	Average
	RUN TIME	1026-1450	1610-2040	0910-1330	
	EMISSIONS DATA - Continued				
	Furans - Continued				
	123678 HxCDF				
(ng)	Catch, ng	0.0546	0.0457	0.0355	0.0453
(ng/dscm)	Concentration, ng/dscm, as measur	0.011651	0.009	0.00739	0.00951
(µg/hr)	Emission Rate, µg/hr	0.03515	0.03	0.023	0.0288
	234678 HxCDF				
(ng)	Catch, ng	0.0873	0.0737	0.0602	0.0737
(ng/dscm)	Concentration, ng/dscm, as measur	0.0186	0.0153	0.0125	0.0155
(µg/hr)	Emission Rate, µg/hr	0.0562	0.0463	0.0384	0.0470
	123789 HxCDF				
(ng)	Catch, ng	0.0137	0.0111	0.00899	0.0113
(ng/dscm)	Concentration, ng/dscm, as measur	0.00292	0.00231	0.00187	0.00237
(µg/hr)	Emission Rate, µg/hr	0.00882	0.00697	0.00573	0.00717
	Total HxCDF				
(ng)	Catch, ng	0.517	0.441	0.345	0.434
(ng/dscm)	Concentration, ng/dscm, as measur	0.110	0.0917	0.0718	0.0913
(µg/hr)	Emission Rate, µg/hr	0.333	0.277	0.220	0.277
	1234678 HpCDF				
(ng)	Catch, ng	0.234	0.208	0.172	0.205
(ng/dscm)	Concentration, ng/dscm, as measur	0.0499	0.0432	0.0358	0.0430
(µg/hr)	Emission Rate, µg/hr	0.151	0.131	0.110	0.130
	1234789 HpCDF				
(ng)	Catch, ng	0.0265	0.0222	0.0188	0.0225
(ng/dscm)	Concentration, ng/dscm, as measur	0.00565	0.00461	0.00391	0.00473
(µg/hr)	Emission Rate, µg/hr	0.0171	0.0139	0.0120	0.0143

( ) Not Detected. Value shown is the detection limit. ND values are used as zero (0) in totals and averages.

{ } Estimated Maximum Possible Concentration. EMPC values ARE included in totals and averages.

Summary of Stack Gas Parameters and Test Results
Malcolm Grow Medical Center - Andrews AFB, MD
US EPA Test Method 23 - PCDD / PCDF
Baghouse Inlet

	RUN NUMBER	M-23-1	M-23-2	M-23-3	
	RUN DATE	36922	36922	36923	Average
	RUN TIME	1026-1450	1610-2040	0910-1330	
	EMISSIONS DATA - Continued				
	Furans - Continued				
	Total HpCDF				
(ng)	Catch, ng	0.37	0.328	0.274	0.324
(ng/dscm)	Concentration, ng/dscm, as measur	0.0790	0.0682	0.0570	0.0681
(µg/hr)	Emission Rate, µg/hr	0.238	0.206	0.175	0.206
	12346789 OCDF				
(ng)	Catch, ng	0.145	0.118	0.113	0.125
(ng/dscm)	Concentration, ng/dscm, as measur	0.0309	0.0245	0.0235	0.0263
(µg/hr)	Emission Rate, µg/hr	0.0934	0.0741	0.0721	0.0798
	Total PCDF				
(ng)	Catch, ng	1.828	1.506	1.214	1.516
(ng/dscm)	Concentration, ng/dscm, as measur	0.390	0.313	0.253	0.319
(µg/hr)	Emission Rate, µg/hr	1.18	0.945	0.774	0.965
	Total PCDD + PCDF				
(ng)	Catch, ng	2.085	1.695	1.380	1.720
(ng/dscm)	Concentration, ng/dscm, as measur	0.445	0.352	0.287	0.361
(µg/hr)	Emission Rate, µg/hr	1.34	1.06	0.881	1.10

( ) Not Detected. Value shown is the detection limit. ND values are used as zero (0) in totals and averages.

{ } Estimated Maximum Possible Concentration. EMPC values ARE included in totals and averages.

CDD/CDF Corrected Stack Gas Concentrations and 2378 TCDD Toxic Equivalent Concentrations
Malcolm Grow Medical Center - Andrews AFB, MD
US EPA Test Method 23 - CDD/CDF
Medical Waste Incinerator Stack

	CONCENTRATION (ng/dscmm, adjusted to 7% O2)				2378-TCDD Toxic Equivalent Factor	2378 TOXIC EQUIVALENCIES (ng/dscmm, adjusted to 7% O2)			
RUN NUMBER	M-23-1	M-23-2	M-23-3			M-23-1	M-23-2	M-23-3	
RUN DATE	1/31/01	1/31/01	2/1/01	Average		1/31/01	1/31/01	2/1/01	Average
RUN TIME	1026-1450	1610-2040	0910-1330			1026-1450	1610-2040	0910-1330	
DIOXINS:									
2378 TCDD	(0.000247)	0.000310	(0.000166)	(0.000096)	1.000	(0.000247)	0.000310	(0.000166)	(0.000096)
Total TCDD	0.00540	0.00427	0.00113	0.00353					
12378 PeCDD	{0.000543}	0.000801	(0.000467)	(0.000430)	0.500	{0.000272}	0.000401	(0.000234)	(0.000215)
Total PeCDD	0.0129	0.0103	0.00539	0.0094					
123478 HxCDD	0.00142	{0.000643}	0.000728	{0.000934}	0.100	0.000142	##########	0.0000728	##########
123678 HxCDD	0.00237	{0.00165}	0.0013	{0.00178}	0.100	0.000237	{0.000165}	0.000133	{0.000178}
123789 HxCDD	0.00145	0.000906	{0.000645}	{0.000995}	0.100	0.000145	0.0000906	##########	##########
Total HxCDD	0.0213	0.0141	0.0111	0.0155					
1234678 HpCDD	0.00852	0.00706	0.00587	0.00713	0.010	0.0000852	0.0000706	0.0000587	0.0000713
Total HpCDD	0.0174	0.0146	0.0119	0.0146					
12346789 OCDD	0.0232	0.0187	0.0181	0.0200	0.001	0.0000232	0.0000187	0.0000181	0.0000200
Total CDD	0.0802	0.0619	0.0477	0.0630		{0.000904}	{0.00112}	{0.000347}	{0.000773}
FURANS:									
2378 TCDF	0.00353	0.00288	0.00212	0.00283	0.100	0.000353	0.000288	0.000212	0.000283
Total TCDF	0.108	0.0870	0.0587	0.0839					
12378 PeCDF	0.00653	0.00499	0.00332	0.00491	0.050	0.000326	0.000250	0.000166	0.000246
23478 PeCDF	0.0145	0.0119	0.00759	0.0112	0.500	0.00727	0.00593	0.00380	0.00562
Total PeCDF	0.141	0.116	0.0794	0.111					
123478 HxCDF	0.0153	0.0131	0.0083	0.0121	0.100	0.00153	0.00131	0.000828	0.00121
123678 HxCDF	0.0170	0.0150	0.0102	0.0140	0.100	0.00170	0.00150	0.00102	0.00140
234678 HxCDF	0.0273	0.0242	0.0172	0.0227	0.100	0.00273	0.00242	0.00172	0.00227
123789 HxCDF	0.00428	0.00364	0.00258	0.00348	0.100	0.000428	0.000364	0.000258	0.000348
Total HxCDF	0.161	0.145	0.0988	0.134					
1234678 HpCDF	0.0731	0.0683	0.0493	0.0631	0.010	0.000731	0.000683	0.000493	0.000631
1234789 HpCDF	0.00827	0.00729	0.00539	0.00694	0.010	0.0000827	0.0000729	0.0000539	0.0000694
Total HpCDF	0.116	0.108	0.0785	0.100					
12346789 OCDF	0.0453	0.0387	0.0324	0.0387	0.001	0.0000453	0.0000387	0.0000324	0.0000387
Total CDF	0.571	0.494	0.348	0.468		0.0152	0.0129	0.00858	0.0121
Total CDD + CDF	0.651	0.556	0.396	0.531		{0.0161}	{0.0140}	{0.00893}	{0.0130}

( ) Indicates value in parentheses is based on the Detection Limit (sample was Not Detected). A total or average value in parentheses means the value includes one or more zero (0) values used in place of the detection limit based value.

{} Indicates the value is based on an EMPC value. The value is used as is in totals and averages.

Summary of Stack Gas Parameters and Test Results
Air Emissions Test
Malcolm Grow Medical Center - Andrews AFB, MD
US EPA Test Method 26 - HCl
Medical Waste Incinerator Stack
Page 1 of 1

	RUN NUMBER	**M26-1**	**M26-3**	**M26-4**	
	RUN DATE	**1/31/01**	**2/1/01**	**2/2/01**	**Average**
	RUN TIME	**1045-1145**	**0910-1010**	**0945-1045**	
	MEASURED DATA				
γ	Meter Box Correction Factor	1.004	1.004	1.004	1.004
P_{bar}	Barometric Pressure, inches Hg	29.90	29.90	29.90	29.90
V_m	Sample Volume, ft^3	120.100	119.810	120.440	120.117
ΔH	Avg Meter Orifice Pressure, in. H	2.20	2.20	2.20	2.20
T_m	Average Meter Temperature, °F	89.6	109.3	90	96.2
CO_2	Carbon Dioxide content, % by vol	5.8	6.1	6.3	6.1
O_2	Oxygen content, % by volume	11.3	11.9	11.6	11.6
Θ	Sample Run Duration, minutes	60	60	60	60
	CALCULATED DATA				
V_{sc}	Standard Meter Volume, liters	116.347	112.056	116.659	115.021
$V_{m(std)}$	Standard Meter Volume, ft^3	4.109	3.957	4.120	4.062
$V_{m(std)}$	Standard Meter Volume, m^3	0.116	0.112	0.117	0.115
Q_m	Average Sampling Rate, lpm	1.94	1.87	1.94	1.92
	EMISSIONS DATA				
	<u>Chlorides as HCl</u>				
	Catch Mass, mg	2.8	0.3	1.1	
F_{Wt}	Formula Weight, lb/lb-mol	36.47	36.47	36.47	
C_{ppmvd}	Concentration, ppm by volume	15.9	1.77	6.22	7.95
$C_{ppm7\%O2}$	Concentration, ppm by vol. at 7%	23.0	2.73	9.29	11.7

APPENDIX E

QA/QC DATA

PACIFIC ENVIRONMENTAL SERVICES, INC.
Central Park West
5001 South Miami Boulevard, P.O. Box 12077
Research Triangle Park, North Carolina 27709-2077
(919) 941-0333 FAX: (919) 941-0234

Initial Dry Gas Meter Calibration Form (English Units)

Date: 1/22/01 Calibrator: DDH Meter Box (DGM) No.: **RMB-15**
P_{bar}, in Hg 30.00 Reference Meter Correction Factor: 1.0077 (10/5/97, 09/28/98, & 09/10/99)

ΔH = 0.5

Trial	Trial Duration (min)	Dry Gas Meter RMB-15 Gas Volume (ft^3) Initial	Final	Net	Meter Temperatures (°F) Inlet Initial	Inlet Final	Inlet Avg.	Outlet Initial	Outlet Final	Outlet Avg.
1	15	464.354	470.464	6.110	72	73	72.5	70	70	70
2	15	470.464	476.579	6.115	72	73	72.5	70	70	70
3	15	476.579	482.679	6.100	72	75	73.5	70	71	70.5

Trial	Reference Meter Gas Volume (ft^3) Initial	Final	Net	Meter Temperatures (°F) Initial	Final	Avg.	DGM Correction Factor γ	Reference Orifice Press $\Delta H_@$ (in. H_2O)
1	567.537	573.492	5.955	64	64	64	0.995	1.719
2	573.492	579.425	5.933	64	64	64	0.990	1.732
3	579.425	585.363	5.938	64	64	64	0.995	1.726

ΔH = 0.75

Trial	Trial Duration (min)	Dry Gas Meter RMB-15 Gas Volume (ft^3) Initial	Final	Net	Meter Temperatures (°F) Inlet Initial	Inlet Final	Inlet Avg.	Outlet Initial	Outlet Final	Outlet Avg.
1	15	499.123	506.571	7.448	74	74	74	72	72	72
2	15	506.571	514.037	7.466	74	74	74	72	72	72
3	15	514.037	521.456	7.419	74	75	74.5	72	71	71.5

Trial	Reference Meter Gas Volume (ft^3) Initial	Final	Net	Meter Temperatures (°F) Initial	Final	Avg.	DGM Correction Factor γ	Reference Orifice Press $\Delta H_@$ (in. H_2O)
1	589.234	596.489	7.255	64	64	64	0.997	1.733
2	596.489	603.728	7.239	64	64	64	0.992	1.740
3	603.728	610.967	7.239	64	64	64	0.998	1.740

ΔH = 1.0

Trial	Trial Duration (min)	Dry Gas Meter RMB-15 Gas Volume (ft^3) Initial	Final	Net	Meter Temperatures (°F) Inlet Initial	Inlet Final	Inlet Avg.	Outlet Initial	Outlet Final	Outlet Avg.
1	10	540.356	546.014	5.658	74	75	74.5	72	72	72
2	10	546.014	551.686	5.672	74	75	74.5	72	72	72
3	10	551.686	557.344	5.658	74	76	75	72	72	72

Trial	Reference Meter Gas Volume (ft^3) Initial	Final	Net	Meter Temperatures (°F) Initial	Final	Avg.	DGM Correction Factor γ	Reference Orifice Press $\Delta H_@$ (in. H_2O)
1	621.021	626.53	5.509	64	64	64	0.996	1.781
2	626.530	632.000	5.470	64	64	64	0.987	1.806
3	632.000	637.500	5.500	64	64	64	0.995	1.786

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5001 South Miami Boulevard, P.O. Box 12077
Research Triangle Park, North Carolina 27709-2077
(919) 941-0333 FAX: (919) 941-0234

Initial Dry Gas Meter Calibration Form (English Units)

Date: 1/22/01 Calibrator: DDH Meter Box (DGM) No.: **RMB-15**

P_{bar}, in Hg 30.00 Reference Meter Correction Factor: 1.0077 (10/5/97, 09/28/98, & 09/10/99)

ΔH = 2.0

Dry Gas Meter RMB-15											
Trial	Trial Duration (min)	Gas Volume (ft^3)			Meter Temperatures (°F)						
					Inlet			Outlet			
		Initial	Final	Net	Initial	Final	Avg.	Initial	Final	Avg.	
1	7	568.937	574.407	5.470	68	67	67.5	67	67	67	
2	7	574.407	579.882	5.475	68	67	67.5	67	67	67	
3	7	579.882	585.360	5.478	68	67	67.5	67	67	67	

Trial	Reference Meter						DGM Correction Factor	Reference Orifice Press
	Gas Volume (ft^3)			Meter Temperatures (°F)				
	Initial	Final	Net	Initial	Final	Avg.	γ	$\Delta H_@$ (in. H_2O)
1	645.018	650.368	5.350	64	62	63	0.989	1.869
2	650.368	655.738	5.370	64	62	63	0.992	1.855
3	655.738	661.113	5.375	64	62	63	0.992	1.852

ΔH = 4.0

Dry Gas Meter RMB-15										
Trial	Trial Duration (min)	Gas Volume (ft^3)			Meter Temperatures (°F)					
					Inlet			Outlet		
		Initial	Final	Net	Initial	Final	Avg.	Initial	Final	Avg.
1	5	600.198	605.660	5.462	74	74	74	72	73	72.5
2	5	605.660	611.129	5.469	74	74	74	72	73	72.5
3	5	611.129	616.609	5.480	74	73	73.5	72	73	72.5

Trial	Reference Meter						DGM Correction Factor	Reference Orifice Press
	Gas Volume (ft^3)			Meter Temperatures (°F)				
	Initial	Final	Net	Initial	Final	Avg.	γ	$\Delta H_@$ (in. H_2O)
1	680.287	685.679	5.392	64	64	64	1.003	1.873
2	685.679	691.070	5.391	64	64	64	1.001	1.873
3	691.070	696.461	5.391	64	64	64	0.999	1.874

Calibration Results

ΔH	γ	$\Delta H_@$
0.50	0.993	1.73
0.75	0.996	1.74
1.0	0.992	1.79
2.0	0.991	1.86
4.0	1.001	1.87

Dry Gas Meter RMB-15 on 01/22/01

Meter Box Calibration Factor	**0.995**
Meter Box Reference Orifice Pressure	**1.80**

PACIFIC ENVIRONMENTAL SERVICES, INC.

Central Park West
5001 South Miami Boulevard, P.O. Box 12077
Research Triangle Park, North Carolina 27709-2077
(919) 941-0333 FAX: (919) 941-0234

Posttest Dry Gas Meter Calibration Form (English Units)

Pretest Calibration Factor 0.995
System Vacuum Setting, (in Hg) 3
Reference Meter Correction Factor 1.0077 (10/5/97, 09/28/98, & 09/10/99)
Date: 2/8/01 P_{bar}, in Hg 29.90 Calibrator: D. Holzschuh Meter Box No.: **RMB-15**

ΔH = 1.8

		Dry Gas Meter RMB-15								
Trial	Duration (min)	Initial (ft³)	Final (ft³)	Net (ft³)	Initial, Inlet (°F)	Final, Inle (°F)	Avg. Inlet (°F)	Initial, Outlet (°F)	Final, Outlet (°F)	Avg. Outlet (°F)
1	10	998.189	1005.909	7.720	76	75	75.5	76	74	75
2	10	1005.909	1013.604	7.695	76	75	75.5	76	74	75
3	10	1013.604	1021.302	7.698	76	74	75	76	74	75

	Reference Meter						Meter Box Correction Factor
	Gas Volume			Meter Temperature			
Trial	Initial (ft³)	Final (ft³)	Net (ft³)	Initial (°F)	Final (°F)	Avg. (°F)	γ
1	945.198	952.898	7.700	74	74	74	1.003
2	952.898	960.579	7.681	74	74	74	1.004
3	960.579	968.264	7.685	74	74	74	1.003

AVERAGE 1.0034
% Change 0.84% PASS

PACIFIC ENVIRONMENTAL SERVICES, INC.

Central Park West
5001 South Miami Boulevard, P.O. Box 12077
Research Triangle Park, North Carolina 27709-2077
(919) 941-0333 FAX: (919) 941-0234

Vost Pretest Dry Gas Meter Calibration Form (English Units)

Pretest Calibration Factor: 1.004
System Vacuum Setting, (in Hg): 3
Reference Meter Correction Factor: N/A
Date: 06/08/00 P_{bar}, in Hg: 30.00 Calibrator: DDH Meter Box No.: **V-6**

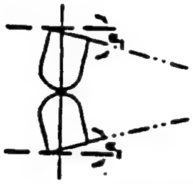
		Vost DGM, liters			Buck Meter, cc/min					
Trial	Duration (min)	Initial Liters	Final Liters	Net Liters	CC	CC	CC	CC	CC	CC
1	10	0	9.712	9.712	979	972	973	974	970	971
2	10	9.712	19.348	9.636	981	971	968	973	971	972
3	10	19.348	28.939	9.591	977	977	969	958	967	978

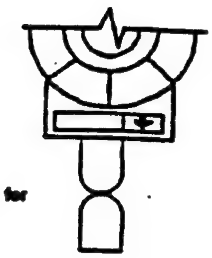
	Reference Meter Gas Volume, cc/minute							
Trial	CC	CC	CC	CC	CC	AVG CC/min	Average lpm	γ
1	972	980	969	972	977	973.55	9.735	1.002
2	981	985	985	982	970	976.27	9.763	1.013
3	988	981	983	990	974	976.55	9.765	1.018

GAMMA 1.011
% Change:

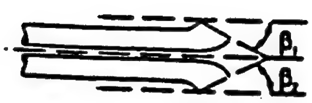
V

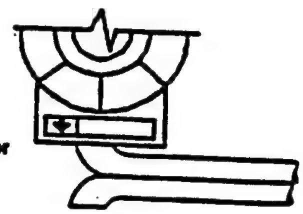
CALIBRATION DATA SHEET 2
Type S Pitot Tube Inspection



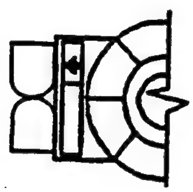


Degree indicating level position for determining α_1 and α_2.

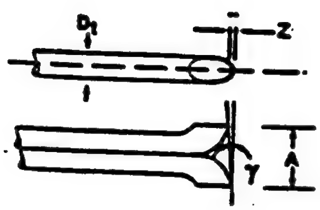


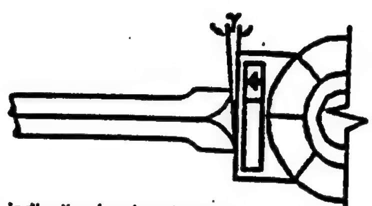


Degree indicating level position for determining β_1 and β_2.



Degree indicating level position for determining θ





Degree indicating level position for determining γ then calculate Z.

Level and Perpendicular?	YES
Obstruction?	NO
Damaged?	NO
α_1 $(-10° \le \alpha_1 \le +10°)$	0
α_2 $(-10° \le \alpha_2 \le +10°)$	1
β_1 $(-5° \le \beta_1 \le +5°)$	0
β_2 $(-5° \le \beta_2 \le +5°)$	1
γ	0
θ	0
$z = A \tan \gamma$ $(\le 0.125")$	0
$w = A \tan \theta$ $(\le 0.03125")$	0
D_t $(3/16" \le D_t \le 3/8")$	3/8
A	.938
$A/2D_t$ $(1.05 \le P_A/D_t \le 1.5)$	1.25

QA/QC Check
Completeness ____ Legibility ____ Accuracy ____ Specifications ____ Reasonableness ____

Certification
I certify that the Type S pitot tube/probe ID# RP-19 meets or exceeds all specifications, criteria and/or applicable design features and is hereby assigned a pitot tube calibration factor C_p of 0.84.

Certified by: . D Brown 7-14-98
Personnel (Signature/Date)

Team Leader (Signature/Date)

TEMPERATURE SENSOR CALIBRATION FORM

Temperature Sensor No. RT-6 Sensor Type K TYPE Length 4'
Ambient Temp. °F 68 Barometric Pressure, "Hg 29.95
Reference Temp. Sensor: 68

Date	Ref. Point No.	Temp. Source	Temp. °F		Temp. Diff. %	Within Limits Y/N	Calibrated By
			Ref. Sensor	Test Sensor			
02/14/01	1	ICE H2O	32	32	0	Y	DDH
	2	AMBIENT AIR	71	68	-.65	Y	DDH
	3	Boiling H2O	210	210	0	Y	DDH
	1						
	2						
	3						
	1						
	2						
	3						
	1						
	2						
	3						
	1						
	2						
	3						
	1						
	2						
	3						

$$\% \text{ Temp. Diff} = \frac{(\text{Ref. Temp} + 460) - (\text{Test Temp.} + 460)}{(\text{Ref. Temp.} + 460)} \times 100 \leq 1.5\ \%$$

SPECTRA GASES INC.
3434 Route 22 West • Branchburg, NJ 08876 USA Tel.: (908) 252-9300 • (800) 932-0624 • Fax: (908) 252-0811
Shipped From: 80 Industrial Drive • Alpha, NJ 08865

CERTIFICATE OF ANALYSIS

EPA PROTOCOL MIXTURE

PROCEDURE # : G1

CUSTOMER: Pacific Env. Services Inc.
SGI ORDER # : 147414
ITEM# : 7
P.O.# : 104-00-0061/62/63

CYLINDER # : CC88665
CYLINDER PRES: 2000 PSIG
CGA OUTLET: 350

CERTIFICATION DATE: 11/02/99
EXPIRATION DATE: 11/02/2002

CERTIFICATION HISTORY

COMPONENT	DATE OF ASSAY	MEAN CONCENTRATION	CERTIFIED CONCENTRATION	ANALYTICAL ACCURACY
Carbon Monoxide	10/26/99 11/02/99	30.42 ppm 30.09 ppm	30.2 ppm	+/- 1%

BALANCE Nitrogen

PREVIOUS CERTIFICATION DATES: None

REFERENCE STANDARDS

COMPONENT	SRM/NTRM#	CYLINDER#	CONCENTRATION
Carbon Monoxide	NTRM-81679	CC88366	97.4 ppm

INSTRUMENTATION

COMPONENT	MAKE/MODEL	SERIAL #	DETECTOR	CALIBRATION DATE(S)
Carbon Monoxide	Horiba VIA-510	570423011	NDIR	10/26/99

THIS STANDARD WAS CERTIFIED ACCORDING TO THE EPA PROTOCOL PROCEDURES.
DO NOT USE THIS STANDARD IF THE CYLINDER PRESSURE IS LESS THAN 150 PSIG.

ANALYST: _____
FRED PIKULA

DATE: 11/02/99

SPECTRA GASES INC.
3434 Route 22 West • Branchburg, NJ 08876 USA Tel.: (908) 252-9300 • (800) 932-0624 • Fax: (908) 252-0811
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CERTIFICATE OF ANALYSIS

EPA PROTOCOL MIXTURE
PROCEDURE # : G1

CUSTOMER: Pacific Env. Services Inc.
SGI ORDER # : 147414
ITEM# : 6
P.O.# : 104-00-0061/62/63

CYLINDER # : CC88530
CYLINDER PRES: 2000 PSIG
CGA OUTLET: 350

CERTIFICATION DATE: 11/02/99
EXPIRATION DATE: 11/02/2002

CERTIFICATION HISTORY

COMPONENT	DATE OF ASSAY	MEAN CONCENTRATION	CERTIFIED CONCENTRATION	ANALYTICAL ACCURACY
Carbon Monoxide	10/26/99 11/02/99	59.64 ppm 59.31 ppm	59.5 ppm	+/- 1%

BALANCE Nitrogen

PREVIOUS CERTIFICATION DATES: None

REFERENCE STANDARDS

COMPONENT	SRM/NTRM#	CYLINDER#	CONCENTRATION
Carbon Monoxide	NTRM-81679	CC88366	97.4 ppm

INSTRUMENTATION

COMPONENT	MAKE/MODEL	SERIAL #	DETECTOR	CALIBRATION DATE(S)
Carbon Monoxide	Horiba VIA-510	570423011	NDIR	10/26/99

THIS STANDARD WAS CERTIFIED ACCORDING TO THE EPA PROTOCOL PROCEDURES.
DO NOT USE THIS STANDARD IF THE CYLINDER PRESSURE IS LESS THAN 150 PSIG.

ANALYST: FRED PIKULA

DATE: 11/02/99

SPECTRA GASES INC.
3434 Route 22 West • Branchburg, NJ 08876 USA Tel.: (908) 252-9300 • (800) 932-0624 • Fax: (908) 252-0811
Shipped From: 80 Industrial Drive • Alpha, NJ 08865

CERTIFICATE OF ANALYSIS

EPA PROTOCOL MIXTURE

PROCEDURE # : G1

CUSTOMER: Pacific Env. Services Inc.
SGI ORDER # : 147414
ITEM# : 5
P.O.# : 104-00-0061/62/63

CYLINDER # : CC88495
CYLINDER PRES: 2000 PSIG
CGA OUTLET: 350

CERTIFICATION DATE: 11/02/99
EXPIRATION DATE: 11/02/2002

CERTIFICATION HISTORY

COMPONENT	DATE OF ASSAY	MEAN CONCENTRATION	CERTIFIED CONCENTRATION	ANALYTICAL ACCURACY
Carbon Monoxide	10/26/99 11/02/99	89.79 ppm 89.60 ppm	89.7 ppm	+/- 1%

BALANCE Nitrogen

PREVIOUS CERTIFICATION DATES: None

REFERENCE STANDARDS

COMPONENT	SRM/NTRM#	CYLINDER#	CONCENTRATION
Carbon Monoxide	NTRM-81679	CC88366	97.4 ppm

INSTRUMENTATION

COMPONENT	MAKE/MODEL	SERIAL #	DETECTOR	CALIBRATION DATE(S)
Carbon Monoxide	Horiba VIA-510	570423011	NDIR	10/26/99

THIS STANDARD WAS CERTIFIED ACCORDING TO THE EPA PROTOCOL PROCEDURES.
DO NOT USE THIS STANDARD IF THE CYLINDER PRESSURE IS LESS THAN 150 PSIG.

ANALYST: FP
FRED PIKULA

DATE: 11/02/99

SPECTRA GASES INC.

3434 Route 22 West • Branchburg, NJ 08876 USA Tel.: (908) 252-9300 • (800) 932-0624 • Fax: (908) 252-0811
Shipped From: 80 Industrial Drive • Alpha, NJ 08865

CERTIFICATE OF ANALYSIS

EPA PROTOCOL MIXTURE

PROCEDURE # : G1

CUSTOMER: Pacific Env. Services Inc.
SGI ORDER # : 162038
ITEM# : 3
P.O.# : 104-01-0017

CYLINDER # : CC114216
CYLINDER PRES: 2000 PSIG
CGA OUTLET: 590

CERTIFICATION DATE: 12/28/2000
EXPIRATION DATE: 12/28/2003

CERTIFICATION HISTORY

COMPONENT	DATE OF ASSAY	MEAN CONCENTRATION	CERTIFIED CONCENTRATION	ANALYTICAL ACCURACY
Oxygen	12/28/2000	12.53 %	12.53 %	+/- 1%
Carbon Dioxide	12/28/2000	10.04 %	10.04 %	+/- 1%

BALANCE Nitrogen

PREVIOUS CERTIFICATION DATES: None

REFERENCE STANDARDS

COMPONENT	SRM/NTRM#	CYLINDER#	CONCENTRATION
Oxygen	NTRM-82659x	CC83908	22.8 %
Carbon Dioxide	NTRM-82745x	CC79944	20.00 %

INSTRUMENTATION

COMPONENT	MAKE/MODEL	SERIAL #	DETECTOR	CALIBRATION DATE(S)
Oxygen	Horiba MPA-510	570694081	PM	12/15/2000
Carbon Dioxide	Horiba VIA-510	571417045	NDIR	12/6/2000

THIS STANDARD IS NIST TRACEABLE. IT WAS CERTIFIED ACCORDING TO THE EPA PROTOCOL PROCEDURES. DO NOT USE THIS STANDARD IF THE CYLINDER PRESSURE IS LESS THAN 150 PSIG.

ANALYST: ___
FRED PIKULA

DATE: 12/28/2000

SPECTRA GASES INC.

3434 Route 22 West • Branchburg, NJ 08876 USA Tel.: (908) 252-9300 • (800) 932-0624 • Fax: (908) 252-0811
Shipped From: 80 Industrial Drive • Alpha, NJ 08865

CERTIFICATE OF ANALYSIS

EPA PROTOCOL MIXTURE

PROCEDURE # : G2

CUSTOMER: Pacific Env. Services Inc.
SGI ORDER # : 147409
ITEM# : 5
P.O.# : 104-00-0063/0064

CYLINDER # : CC91083
CYLINDER PRES: 2000 PSIG
CGA OUTLET: 590

CERTIFICATION DATE: 10/27/99
EXPIRATION DATE: 10/27/2002

CERTIFICATION HISTORY

COMPONENT	DATE OF ASSAY	MEAN CONCENTRATION	CERTIFIED CONCENTRATION	ANALYTICAL ACCURACY
Oxygen	10/27/99	22.4 %	22.4 %	+/- 1%
Carbon Dioxide	10/27/99	22.4 %	22.4 %	+/- 1%

BALANCE Nitrogen

PREVIOUS CERTIFICATION DATES: None

REFERENCE STANDARDS

COMPONENT	SRM/NTRM#	CYLINDER#	CONCENTRATION
Oxygen	NTRM-82659X	CC83900	22.80 %
Carbon Dioxide	NTRM-82745x	CC79944	20.00 %

INSTRUMENTATION

COMPONENT	MAKE/MODEL	SERIAL #	DETECTOR	CALIBRATION DATE(S)
Oxygen	Horiba MPA-510	570694081	PM	10/26/99
Carbon Dioxide	Horiba VIA-510	571417045	NDIR	10/27/99

THIS STANDARD WAS CERTIFIED ACCORDING TO THE EPA PROTOCOL PROCEDURES.
DO NOT USE THIS STANDARD IF THE CYLINDER PRESSURE IS LESS THAN 150 PSIG.

ANALYST: ___ FRED PIKULA

DATE: 10/27/99

SPECTRA GASES INC.

3434 Route 22 West • Branchburg, NJ 08876 USA Tel.: (908) 252-9300 • (800) 932-0624 • Fax: (908) 252-0811
Shipped From: 80 Industrial Drive • Alpha, NJ 08865

CERTIFICATE OF ANALYSIS

EPA PROTOCOL MIXTURE

PROCEDURE # : G1

CUSTOMER: Cherokee Instruments Inc.
SGI ORDER # : 156722
ITEM# : 6
P.O.# : 3818

CYLINDER # : CC55783
CYLINDER PRES: 2000 PSIG
CGA OUTLET: 660

CERTIFICATION DATE: 8/10/2000
EXPIRATION DATE: 8/10/2002

CERTIFICATION HISTORY

COMPONENT	DATE OF ASSAY	MEAN CONCENTRATION	CERTIFIED CONCENTRATION	ANALYTICAL ACCURACY
Sulfur Dioxide	8/2/2000 8/10/2000	45.04 ppm 45.17 ppm	45.1 ppm	+/- 1%

BALANCE Nitrogen

PREVIOUS CERTIFICATION DATES: None

REFERENCE STANDARDS

COMPONENT	SRM/NTRM#	CYLINDER#	CONCENTRATION
Sulfur Dioxide	NTRM-81694	CC55796	96.0 ppm

INSTRUMENTATION

COMPONENT	MAKE/MODEL	SERIAL #	DETECTOR	CALIBRATION DATE(S)
Sulfur Dioxide	Horiba VIA-510	851221093	NDIR	7/28/2000

THIS STANDARD WAS CERTIFIED ACCORDING TO THE EPA PROTOCOL PROCEDURES.
DO NOT USE THIS STANDARD IF THE CYLINDER PRESSURE IS LESS THAN 150 PSIG.

ANALYST:
FRED PIKULA

DATE: 8/10/2000

For Technical Information Call
1-800-752-1597

AIR PRODUCTS

Air Products and Chemicals, Inc. * 12722 S. Wentworth Avenue, Chicago, IL 60628

ISO CERTIFICATION: 9002

CERTIFICATE OF ANALYSIS: EPA PROTOCOL GAS STANDARD

PERFORMED ACCORDING TO EPA TRACEABILITY PROTOCOL FOR ASSAY AND CERTIFICATION OF GASEOUS CALIBRATION STANDARDS (PROCEDURE #G1)

Customer:
AIR PRODUCTS AND CHEMICALS, INC.
4822 INDUSTRY LANE
UDI BUSINESS PARK
DURHAM NC 27709

Order No: CSS-190592-01
Batch No: 861-59105
PO:
Release:

Cylinder No: SG9119904BAL
Bar Code No: DWJ098
Cylinder Pressure*: 2000 psig
Certification Date: 06/26/1999
Expiration Date: 06/26/2001

CERTIFIED CONCENTRATION		REFERENCE STANDARDS			ANALYTICAL INSTRUMENTATION			
Component	Certified Concentration	Cylinder Number	Standard Type	Standard Concentration	Instrument Make/Model	Serial Number	Last Calibration	Measurement Principal
SULFUR DIOXIDE	91.7 ±1.7 PPM	SG9150968BAL	NTRM 81661X	169.7 PPM	HORIBA VIA-510	85079208	06/18/99	NON DISPERSIVE INFRARED
NITROGEN	Balance Gas							

* STANDARD SHOULD NOT BE USED BELOW 150 PSIG

Analyst: J. Lass
James Lass

Approved By: R. Fry
Richard Fry

(16921)

No. 320-9702

RATA CLASS

Scott Specialty Gases

Dual-Analyzed Calibration Standard

1290 COMBERMERE STREET,TROY,MI 48083 Phone: 248-589-2950 Fax: 248-589-2134

CERTIFICATE OF ACCURACY: EPA Protocol Gas

Assay Laboratory

SCOTT SPECIALTY GASES
1290 COMBERMERE STREET
TROY,MI 48083

P.O. No.: 103-00-292
Project No.: 05-70839-002

Customer

PACIFIC ENVIRONMENTAL SERVICES,INC
BRUCE SAVEN
7209 E. KEMPER RD
CINCINNATI OH 45249-1030

ANALYTICAL INFORMATION

This certification was performed according to EPA Traceability Protocol For Assay & Certification of Gaseous Calibration Standards; Procedure #G1; September, 1997.

Cylinder Number: ALM031852 **Certification Date:** 12/14/00 **Exp. Date:** 12/13/2002
Cylinder Pressure***: 1900 PSIG

COMPONENT	CERTIFIED CONCENTRATION (Moles)		ANALYTICAL ACCURACY**	TRACEABILITY
NITRIC OXIDE	254.13	PPM	+/- 1%	Direct NIST and NMi
NITROGEN - OXYGEN FREE		BALANCE		
TOTAL OXIDES OF NITROGEN	254.9	PPM		Reference Value Only

*** Do not use when cylinder pressure is below 150 psig.
** Analytical accuracy is based on the requirements of EPA Protocol procedure G1, September 1997.
Product certified as +/- 1% analytical accuracy is directly traceable to NIST or NMI standards.

REFERENCE STANDARD

TYPE/SRM NO.	EXPIRATION DATE	CYLINDER NUMBER	CONCENTRATION	COMPONENT
NTRM 1687	3/01/03	ALM024630	1000. PPM	NITRIC OXIDE

INSTRUMENTATION

INSTRUMENT/MODEL/SERIAL#	DATE LAST CALIBRATED	ANALYTICAL PRINCIPLE
BECKMAN/951/010177	12/14/00	CHEMILUMINESCENCE

ANALYZER READINGS

(Z = Zero Gas R = Reference Gas T = Test Gas r = Correlation Coefficient)

NITRIC OXIDE

First Triad Analysis

Date:12/06/00	Response Unit:MV	
Z1 = 0.00000	R1 = 100.0000	T1 = 101.7000
R2 = 100.0000	Z2 = 0.00000	T2 = 101.5000
Z3 = 0.00000	T3 = 101.5000	R3 = 100.0000
Avg. Concentration:	253.4	PPM

Second Triad Analysis

Date: 12/14/00	Response Unit: MV	
Z1 = 0.00000	R1 = 100.0000	T1 = 51.60000
R2 = 100.0000	Z2 = 0.00000	T2 = 51.60000
Z3 = 0.00000	T3 = 51.60000	R3 = 100.0000
Avg. Concentration:	254.9	PPM

Calibration Curve

Concentration = A + Bx + Cx2 + Dx3 + Ex4	
r = .999992785	1686
Constants:	A = 1.220822425
B = 10.000876060	C = 0
D = 0	E = 0

APPROVED BY:

~~RATA CLASS~~

Scott Specialty Gases

Dual-Analyzed Calibration Standard

1290 COMBERMERE STREET,TROY,MI 48083 Phone: 248-589-2950 Fax: 248-589-2134

CERTIFICATE OF ACCURACY: EPA Protocol Gas

Assay Laboratory

SCOTT SPECIALTY GASES
1290 COMBERMERE STREET
TROY,MI 48083

P.O. No.: 103-00-292
Project No.: 05-70839-003

Customer

PACIFIC ENVIRONMENTAL SERVICES,INC
BRUCE SAVEN
7209 E. KEMPER RD
CINCINNATI OH 45249-1030

ANALYTICAL INFORMATION

This certification was performed according to EPA Traceability Protocol For Assay & Certification of Gaseous Calibration Standards; Procedure #G1; September, 1997.

Cylinder Number: AAL18927 **Certification Date:** 12/14/00 **Exp. Date:** 12/14/2002
Cylinder Pressure*:** 1900 PSIG

COMPONENT	CERTIFIED CONCENTRATION (Moles)		ANALYTICAL ACCURACY**	TRACEABILITY
NITRIC OXIDE	472.4	PPM	+/- 1%	Direct NIST and NMi
NITROGEN - OXYGEN FREE		BALANCE		
TOTAL OXIDES OF NITROGEN	473.1	PPM		Reference Value Only

*** Do not use when cylinder pressure is below 150 psig.
** Analytical accuracy is based on the requirements of EPA Protocal procedure G1, September 1997.
Product certified as +/- 1% analytical accuracy is directly traceable to NIST or NMI standards.

REFERENCE STANDARD

TYPE/SRM NO.	EXPIRATION DATE	CYLINDER NUMBER	CONCENTRATION	COMPONENT
NTRM 1687	3/01/03	ALM024630	1000. PPM	NITRIC OXIDE

INSTRUMENTATION

INSTRUMENT/MODEL/SERIAL#	DATE LAST CALIBRATED	ANALYTICAL PRINCIPLE
BECKMAN/951/010177	12/14/00	CHEMILUMINESCENCE

ANALYZER READINGS

(Z=Zero Gas R=Reference Gas T=Test Gas r=Correlation Coefficient)

First Triad Analysis **Second Triad Analysis** **Calibration Curve**

NITRIC OXIDE

First Triad Analysis		
Date:12/06/00	Response Unit:MV	
Z1=0.00000	R1=100.0000	T1=47.00000
R2=100.0000	Z2=0.00000	T2=47.00000
Z3=0.00000	T3=47.00000	R3=100.0000
Avg. Concentration:	472.1	PPM

Second Triad Analysis		
Date: 12/14/00	Response Unit: MV	
Z1=0.00000	R1=100.0000	T1=47.00000
R2=100.0000	Z2=0.00000	T2=47.10000
Z3=0.00000	T3=47.10000	R3=100.0000
Avg. Concentration:	472.8	PPM

Calibration Curve	
Concentration=A+Bx+Cx2+Dx3+Ex4	
r=.999992785	1687
Constants:	A=1.220822425
B=10.000976060	C=0
D=0	E=0

APPROVED BY: